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ABSTRACT

Educational research studies conducted in recent years are distilled into 59 significant findings or conclusions that can be used as a practical guide for parents and teachers seeking those educational practices found to be most effective in helping children to learn. The 59 findings are displayed one to a page. Each page is organized into three parts: (1) the "research finding," stated succinctly; (2) several paragraphs of "comment" elaborating on the finding; and (3) "references" to the major educational research studies that support the finding. The findings cover such topics as: reading to children, counting, early writing, developing talent, getting parents involved, phonics, science experiments, managing classroom time, tutoring, memorization, homework, school climate, discipline, effective principals, cultural literacy, foreign language, rigorous courses, extracurricular activities, and preparation for work. The 59 findings are grouped under three major headings: Home (9 topics), Classroom (29 topics), and School (21 topics). This handbook represents a concerted effort to demonstrate that the educational process is susceptible to being understood and that research can reveal practical concepts that will improve that process. It is an attempt to supply clear, accurate, reliable, and non-controversial information to parents and educators on some of the most important everyday educational questions. The original "What Works" (March 1986) contained 41 selected research findings about what works when it comes to educating a child. This updated edition contains an additional 19 findings, covering such topics as: television, teacher feedback, behavior problems, illustrations, solving word problems, cooperative learning, reading aloud, character education, libraries, attendance, success in a new school, mainstreaming, school to work transition. One earlier finding, on unexcused absences, was dropped. (WTB)

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Research About Teaching And Learning

SECOND EDITION

U.S. Department of Education

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WHAT WORKS

Research About Teaching and Learning

SECOND EDITION

United States Department of Education
William J. Bennett, Secretary
1987

THE WHITE HOUSE

WASHINGTON

March 18, 1987

We Americans have always considered education a key to individual achievement and national strength. We know that education begins in the home and flourishes when it draws upon the combined efforts of children, parents, teachers, and administrators.

The first volume of What Works provided practical knowledge to help in the education of our children. This updated and revised volume of research findings continues in that tradition and exemplifies the type of information the Federal government should continually provide.

I am confident that as the American people continue to benefit from such knowledge and to further strengthen their renewed trust in common sense, we will have even greater success in our unstinting efforts to improve our schools and better prepare our children for the challenges of today's world.

Ronald Reagan

FOREWORD

Knowledge will forever govern ignorance; and a people who mean to be their own governors must arm themselves with the power which knowledge gives.

James Madison, 1751-1836
Letter of August 4, 1822
to Lieutenant Governor
Barry of Kentucky

William J. Bennett
Secretary of Education

Since we released *What Works: Research About Teaching and Learning* in March 1986, the Department of Education has been deluged with requests for the booklet. We have distributed more than half a million copies to parents and children, teachers and principals, scholars and policy-makers.

Editorials praising the book's clarity, good sense, and usefulness have appeared in newspapers from *The Christian Science Monitor* to the *New York Post*. Teachers have told us that it should be studied by every present and future member of their profession.

Unlike most education research—and many government reports—*What Works* was addressed to the American people. It provides accurate and actionable information about what works in the education of our children, and it does so in a form that is accessible to all of us—parents and taxpayers, teachers and legislators, newspaper reporters and their readers, school principals and school board members.

The original *What Works* contained 41 findings from some of the best research about what works when it comes to educating a child. This updated edition contains an additional 18 findings. The information in this booklet is a distillation of a large body of scholarly research in the field of education.

The American people have responded favorably. An Ohio mother wrote: "My daughter is only 16 months old, but I feel your booklet has already given me ideas to help her learn more. I will be sure to read it again when she enters school."

The Chicago Board of Education, spurred by the *What Works* finding documenting the benefit of homework, has promulgated a policy requiring that all students be assigned homework every night.

Principals are using *What Works* for staff development, professors for courses they teach. The booklet has been reprinted from Juneau, Alaska, to Albany, New York, by boards and departments of education, school districts and professional associations. The superintendent of schools in St. Paul, Minnesota, gave every one of his professional employees a complete copy of *What Works*. The University of Texas used it to create a home learning guide for parents in both English and Spanish. The National Association of Secondary School Principals and the National School Boards Association also reproduced copies.

The Appalachia Educational Laboratory in Charleston, West Virginia, developed a workshop to train school personnel to use *What Works* with administrators, teachers and parents. As a result, one elementary principal has begun sending home to parents written notices featuring a different finding from the booklet each week. Several teachers in the area have started inviting small groups of parents to the school for regular meetings to discuss some of the findings.

What Works was even used as a Christmas stocking stuffer! A fifth-grader from Kenmore, New York, wrote: "I would like a *What Works* book. I would give it to my mom and dad for Christmas. Probably after they were through with it I would read it. I'm sure it would be a good book."

Clearly, the American people know a good thing when they see it, and we're heartened by that. But even

though the response has been overwhelmingly positive, we have had our critics. They complain that *What Works* tells only part of the story; that its real purpose is to divert attention from the Federal education budget; that it just rehashes old stuff that everybody already knows; and that it only helps white, middle-class kids.

What Works does leave some things out. It is not an encyclopedia; it was never meant to be. It simply tells a part of the story—maybe the most important part. (And this updated edition, with its additional findings, tells a larger part than the original volume did.) As for the budget criticism, we will all differ on the appropriate level of Federal funding. But the fact remains, if we want to give our children a good education, we have to do the things described in *What Works*. We can spend all the money in the world, yet if we do not do these kinds of things, we won't get the education results our youngsters need.

Some cavil that *What Works* simply repeats things we've known for a long time. Common sense tells us that children improve their reading ability by reading a lot. True, but why are there so many students coming out of school who can barely read?

The fact that homework helps students learn is nothing new. Yet, why do one-third of our 9-year-olds say they have no homework? Perhaps people need to be reminded of "what everyone knows"; common sense has to be reinforced and acted upon. Our purpose in *What Works* is to make this happen so that our practices correspond to "what we do know."

Others mutter that this book leaves disadvantaged youngsters out in the cold. Quite the contrary. Many of the findings in *What Works* come from "effective schools" research that was done primarily to determine what kinds of schools help poor, disadvantaged and minority children the most. We *know* these things can work for those children.

This is important because middle- and upper-class kids often manage to get by in life with a mediocre education. This is much less likely for disadvantaged youngsters; a good education is frequently their only ticket to a better life.

Many schools, located in desolate inner city neighborhoods, know and practice what works. Making sure that the lessons these schools can teach us become more widely known and followed is one of my top priorities. That's why we have prepared another volume on what works for disadvantaged youngsters.

In the meantime, I am confident the findings in this booklet can help *all* children learn more. I see evidence everyday that they really do work. For example, the Department's recent study, *Japanese Education Today*, makes plain that many of the research findings in *What Works* have been standard practice in Japan's education system for years. Parent involvement, clear school goals, high expectations—all discussed in *What Works*—have contributed to the manifest success of Japanese schools.

When the first edition of *What Works* was issued, I invited readers to send us comments and to suggest topics they would like to see in future books. This revised edition incorporates many of these suggestions, corrects a few errors, and updates some of the findings contained in the original publication.

We chose the new findings for this revised edition according to the same criteria by which the original findings were selected: they tell us things we can do at home, in classrooms and in schools to help our children learn more. And that, after all, is what education is all about.

Dr. Chester E. Finn, Jr., Assistant Secretary for Research and Improvement, and his staff prepared the original *What Works* as well as this updated version. As he explains in the introduction that follows, many individuals inside and outside the Education Department have contributed their ideas, knowledge and energies. I am grateful to them all.

Education is not a dismal science, though many act as if it were. In education research, of course, there is still much to find out, but education is not essentially mysterious. One of my goals is to make sense of education and talk about it in terms that the American public can understand. We want to make the best information available to the American people.

This booklet is a significant part of that effort. It is, of course, entirely up to the reader to decide which parts of it, if any, to put into practice. All we can do is suggest that they do, in fact, work.

WHAT WORKS

Research About Teaching and Learning

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INTRODUCTION

Badness you can get easily, in quantity: the road is smooth, and it lies close by. But in front of excellence the immortal gods have put sweat, and long and steep is the way to it, and rough at first. But when you come to the top, then it is easy, even though it is hard.

Hesiod, c. 700 B.C.
Works and Days

Chester E. Finn, Jr.
Assistant Secretary for Research and Improvement
and Counselor to the Secretary

In March 1986, the U.S. Department of Education produced a slim volume called *What Works*. It was the first major publication of the newly reorganized research and statistics unit of the department, and it elicited a hefty response.

It contained 41 research findings about what works in the education of our children. The findings were written in plain English so that anyone concerned with education could put them to use.

The report was by no means comprehensive; it covered many but not all spheres of education research. We sought findings based on systematic inquiry, statistical evidence and expert opinion, findings that have stood the test of time. Professional staff members in the Office of Educational Research and Improvement and expert outside reviewers checked and rechecked each finding.

The report focused on what works for the individual child. Therefore, the findings were aimed mainly at parents and teachers—those individuals with the most direct and profound impact on what children do or do not learn.

The book in your hand is an updated and expanded edition of *What Works*. It includes the original 41 findings—with a few revisions—as well as 18 new ones gathered from the field.

This is consistent with a commitment we made in the original *What Works* to keep supplying information to the American public. Secretary Bennett asked readers to respond to the book and to suggest areas of research they would like to see covered in future volumes.

Letters and postcards streamed in. So did friendly, sometimes laudatory comments from school board members and newspaper editors; teachers and parents; and members of the research community, including current and past presidents of the American Educational Research Association. We were especially pleased that thousands of principals, teachers, and parents read the booklet, then took time to write to tell us in what ways they found it helpful.

Perhaps the toughest part of preparing a booklet like *What Works* is wrestling complex research findings into plain language without sacrificing accuracy or validity. The response *What Works* has elicited from the academic community reassures us that we did not do excessive violence to the research, even as the response from our large readership indicates that we achieved a reasonable degree of clarity and utility.

The booklet has inspired several other nations to develop their own research syntheses. In addition, an *International What Works* will be produced by the International Academy of Education and the International Association for the Evaluation of Educational Achievement (IEA).

Of course we've also had critics. Most have been responsible and constructive. Some were chiefly concerned that issues or findings of special interest to them weren't included.

Others have tweaked *What Works* for being nothing more than a book of common sense. In truth, I view that more as a compliment than criticism. Common sense has taken a severe beating in recent years in education. *What Works*, bolstered by research, gives common sense a renewed legitimacy. If this is what it takes to get more common sense into the classroom

and into the curriculum of the home, so be it.

One of the more puzzling criticisms is that *What Works* is relevant only for middle-class youngsters. As Secretary Bennett remarks in his foreword, this just isn't so. Many of the findings in the booklet are drawn from research on the education of disadvantaged children. Much of this research has been carried out in the past 20 years. Prior to this period, many people supposed that disadvantaged and minority children did poorly in school mainly because resources were unequally distributed. To document this belief, Congress commissioned a huge national survey of the schools. The 1966 Coleman Report,* as it was called, is probably the best known and most influential piece of educational research ever published. Its conclusion—that unequal achievement could not be ascribed to unequal school resources—so offended the conventional wisdom of the time that the next 20 years of educational research were dominated by the quest for contrary evidence.

Heated arguments followed, concerning appropriate expectations and optimal methods of instruction for disadvantaged children. Research, in the end, documented such straightforward propositions as this: children are more likely to learn the basics in schools that emphasize the basics and less likely to learn them in schools that do not. The bulk of the findings presented in *What Works* come from this body of serious and fairly recent research on the education of disadvantaged youngsters.

Some expressed concern that *What Works* will work only for kids who live in two-parent homes. Indeed, the booklet says, "Parents are their children's first and most influential teachers. What parents do to help their children learn is more important to academic success than how well-off the family is." But it doesn't say white parents, or middle-class parents, or rich parents, or two parents. It says parents, period. The essential point is that any child's education is hugely enhanced if someone—or several someones—actually does what research shows parents can do to assist and encourage that child.

In assembling *What Works*, we confined ourselves to findings that are useful and important. We sought to include only those about which research evidence and expert opinion were consistent, persuasive, and fairly stable over time.

The findings in the original *What Works* were generated by OERI staff who combed large portions of available research literature. They synthesized and analyzed what they found and developed a set of findings that represent a sample of research that is tried and true.

For this update, we invited practicing educators, researchers and other interested parties throughout the country to do the same. Teachers, principals, administrators, colleges of education, educational associations and researchers submitted possible findings.

We insisted that the submissions be clearly written, address issues affecting large numbers of preschool, elementary or secondary students, and be based on solid research.

OERI professional staff members scrutinized each submission for validity

*Coleman, James S., et al. (1966). *Equality of Educational Opportunity*. Washington, DC: U.S. Government Printing Office.

and reliability. The findings deemed suitable for this edition were sent to outside reviewers who checked them for reliability, validity, importance, and usefulness.

The hard part was translating the research into clear language. To be sure, some findings *cannot* be made intelligible and usable to a general audience—but then they don't belong in a volume of this sort. Even so, we may have let in some research findings that some readers will find obscure, puzzling, or impractical and still others that seem to oversimplify complex phenomena or prematurely to resolve hotly contested disputes.

That is a risk we must take. All of the new submissions for this volume had to be revised, edited, or rewritten for a general audience. Although we went to great lengths to assure accuracy, we assume responsibility for any errors that may have crept into them during this translation process.

We received many more submissions than met our stringent criteria. Hence, we discarded more items than we kept, among them dozens of research findings that we judged to be less reliable, less helpful, or less consequential than those we retained.

I'm sorry that so few of the externally submitted findings dealt with core subjects or with things that parents can do to help their children learn. Some of the submissions focused on specific projects that appeared successful in particular districts or local schools but that had not yet been replicated on a scale that would transform them from anecdotes into general statements.

The 59 findings in this volume tell us some of what we can do to make it more likely that all children will emerge into adulthood with the basic skills and knowledge that some children seem to acquire easily as they go through school. Our challenge was to present these findings in ways that anyone concerned with education would find helpful. I believe we have met our challenge.

Although we have distributed more than half a million copies of *What Works*, we've just touched the tip of the iceberg. There are more than 2.5 million teachers and 110,000 principals in this country—not to mention some 92,000 school board members and the parents of 45.4 million school children. We owe it to them, too, to let them know what works. I encourage you, the reader, to make sure your friends, coworkers, and anyone interested in education get a copy of *What Works*.

On behalf of Secretary Bennett as well as myself, I want to thank those whose efforts made this report possible. Their names are listed at the end of the booklet.

We especially appreciated the contributions of the outside reviewers who helped assure the accuracy, veracity, validity, and importance of the contents of this volume: Joseph Adelson, David Bennett, Terry Borton, Margaret Bush, Lois Coit, Bernard Gifford, Robert Glaser, James Harding, Robert Hogan, Lillian Katz, Michael Kirst, Rita Kramer, Leanna Landsmann, Jean Marzollo, Diane Ravitch, Robert Ruskin, Kevin Ryan, Marshall Smith, Kathy Stroh, Herbert Walberg, and the staff of the Learning Research and Development Center.

HOME

If we want to educate a person in virtue we must polish him at a tender age. And if someone is to advance toward wisdom he must be opened up for it in the first years of his life when his industriousness is still burning, his mind is malleable, and his memory still strong.

Comenius, 1592-1670
The Great Didactic

Research Finding:

Parents are their children's first and most influential teachers. What parents do to help their children learn is more important to academic success than how well-off the family is.

Comment:

Parents can do many things at home to help their children succeed in school. Unfortunately, recent evidence indicates that many parents are doing much less than they might. For example, American mothers on average spend less than half an hour a day talking, explaining, or reading with their children. Fathers spend less than 15 minutes.

They can create a "curriculum of the home" that teaches their children what matters. They do this through their daily conversations, household routines, attention to school matters, and affectionate concern for their children's progress.

Conversation is important. Children learn to read, reason, and understand things better when their parents:

- read, talk, and listen to them,
- tell them stories, play games, share hobbies, and
- discuss news, TV programs, and special events.

In order to enrich the "curriculum of the home," some parents:

- provide books, supplies, and a special place for studying,
- observe routine for meals, bedtime, and homework, and
- monitor the amount of time spent watching TV and doing after-school jobs.

Parents stay aware of their children's lives at school when they:

- discuss school events,
- help children meet deadlines, and
- talk with their children about school problems and successes.

Research on both gifted and disadvantaged children shows that home efforts can greatly improve student achievement. For example, when parents of disadvantaged children take the steps listed above, their children can do as well at school as the children of more affluent families.

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When by these gentle ways [a child] begins to be able to read, some easy pleasant book, suited to his capacity, should be put into his hands, wherein the entertainment that he finds, might draw him on, and reward his pains in reading; and yet not such as should fill his head with perfectly useless trumpery, or lay the principles of vice and folly. To this purpose I think Aesop's Fables the best, which being stories apt to delight and entertain a child, may yet afford useful reflections to a grown man; and if his memory retain them all his life after, he will not repent to find them there, amongst his manly thoughts, and serious business.

John Locke, 1632-1704
Some Thoughts on Education

Reading to Children

Research Finding:

The best way for parents to help their children become better readers is to read to them—even when they are very young. Children benefit most from reading aloud when they discuss stories, learn to identify letters and words, and talk about the meaning of words.

Comment:

The specific skills required for reading come from direct experience with written language. At home, as in school, the more reading the better.

Parents can encourage their children's reading in many ways. Some tutor informally by pointing out letters and words on signs and containers. Others use more formal tools, such as workbooks. But children whose parents simply read to them perform as well as those whose parents use workbooks or have had training in teaching.

The conversation that goes with reading aloud to children is as important as the reading itself. When parents ask children only superficial questions about stories, or don't discuss the stories at all, their children do not achieve as well in reading as the children of parents who ask questions that require thinking and who relate the stories to everyday events. Kindergarten children who know a lot about written language usually have parents who believe that reading is important and who seize every opportunity to act on that conviction by reading to their children.

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Independent Reading

Research Finding: **Children improve their reading ability by reading a lot. Reading achievement is directly related to the amount of reading children do in school and outside.**

Comment: Independent reading increases both vocabulary and reading fluency. Unlike using workbooks and performing computer drills, reading books gives children practice in the "whole act" of reading, that is, both in discovering the meanings of individual words and in grasping the meaning of an entire story. But American children do not spend much time reading independently at school or at home. In the average elementary school, for example, children spend just 7 to 8 minutes a day reading silently. At home, half of all fifth graders spend only 4 minutes a day reading. These same children spend an average of 130 minutes a day watching television.

Research shows that the amount of leisure time spent reading is directly related to children's reading comprehension, the size of their vocabularies, and the gains in their reading ability. Clearly, reading at home can be a powerful supplement to classwork. Parents can encourage leisure reading by making books an important part of the home, by giving books or magazines as presents, and by encouraging visits to the local library.

Another key to promoting independent reading is making books easily available to children through classroom libraries. Children in classrooms that have libraries read more, have better attitudes about reading, and make greater gains in reading comprehension than children in classrooms without libraries.

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Early Writing

Research Finding: **Children who are encouraged to draw and scribble "stories" at an early age will later learn to compose more easily, more effectively, and with greater confidence than children who do not have this encouragement.**

Comment: Even toddlers, who can hardly hold a crayon or pencil, are eager to "write" long before they acquire the skills in kindergarten that formally prepare them to read and write.

Studies of very young children show that their carefully formed scrawls have meaning to them, and that this writing actually helps them develop language skills. Research suggests that the best way to help children at this stage of their development as writers is to respond to the ideas they are trying to express.

Very young children take the first steps toward writing by drawing and scribbling or, if they cannot use a pencil, they may use plastic or metal letters on a felt or magnetic board. Some preschoolers may write on toy typewriters; others may dictate stories into a tape recorder or to an adult, who writes them down and reads them back. For this reason, it is best to focus on the intended meaning of what very young children write, rather than on the appearance of the writing.

Children become more effective writers when parents and teachers encourage them to choose the topics they write about, then leave them alone to exercise their own creativity. The industriousness of such children has prompted one researcher to comment that they "violate the child labor laws."

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It is befitting, then, Glaucon, that this branch of learning should be prescribed by our law and that we should induce those who are to share the highest functions of state to enter upon that study of calculation and take hold of it, not as amateurs, but to follow it up until they attain to the contemplation of the nature of number by pure thought,...for facilitating the conversion of the soul itself from the world of generation to essence and truth.

Plato, 428-348 B.C.
The Republic, Book VII

Counting

Research Finding:

A good way to teach children simple arithmetic is to build on their informal knowledge. This is why learning to count everyday objects is an effective basis for early arithmetic lessons.

Comment:

Young children are comfortable with numbers; "math anxiety" comes in later years. Just watching the enjoyment children get from songs and nursery rhymes that involve counting is ample evidence of their natural ease. These early counting activities can set the stage for later, more formal exposure to arithmetic.

But counting is not limited to merely reciting strings of numbers. It also includes matching numbers to objects and reaching totals (for example, counting the number of apples sitting on the table). Children learn to do arithmetic by first mastering different counting strategies, beginning with rote counting (1,2,3,4), and progressing to memorized computations ($2 \times 2 = 4$). As children learn the facts of arithmetic, they also learn to combine those facts by using more sophisticated strategies. As their skills grow, they rely less and less on counting.

When teachers begin by using children's informal knowledge, then proceed to more complex operations, children learn more readily and enjoy it.

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Research Finding: **A good foundation in speaking and listening helps children become better readers.**

Comment: When children learn to read, they are making a transition from spoken to written language. Reading instruction builds on conversational skills: the better children are at using spoken language, the more successfully they will learn to read written language. To succeed at reading, children need a basic vocabulary, some knowledge of the world around them, and the ability to talk about what they know. These skills enable children to understand written material more readily.

Research shows a strong connection between reading and listening. A child who is listening well shows it by being able to retell stories and repeat instructions. Children who are good listeners in kindergarten and first grade are likely to become successful readers by the third grade. Good fifth-grade listeners are likely to do well on aptitude and achievement tests in high school.

Parents and teachers need to engage children in thoughtful discussions on all subjects—current events, nature, sports, hobbies, machines, family life, and emotions—in short, on anything that interests children. Such discussions should not be limited to reading selections that are part of classwork.

Conversing with children about the world around them will help them reflect on past experiences and on what they will see, do, and read about in the future.

Speaking English at school is especially important for children who have not grown up speaking English.

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Research Finding: **Excessive television viewing is associated with low academic achievement. Moderate viewing, especially when supervised by parents, can help children learn.**

Comment: Watching television more than 2–3 hours a day often hurts children's achievement in reading, writing, and mathematics, especially if it disrupts homework and leisure reading. More time spent viewing means less time for more intellectual activities. High-achieving students, those with high educational and career aspirations, and those who are unlikely to participate in stimulating leisure activities such as sports and hobbies, are most likely to suffer.

Moderate TV viewing can, however, actually help students from backgrounds in which books, magazines, and other mind-enriching resources are in short supply. In such cases, television can expand children's horizons, introduce them to new concepts, give them information which would otherwise be inaccessible, stimulate their imaginations, and enlarge their vocabularies.

Parents and other adults influence how TV viewing affects children. Parents need to be aware of how much TV their children watch and how important it is to monitor their viewing time. When an adult selects and monitors a child's TV viewing—answering questions, explaining words, concepts, or twists and turns of the plot—the child's verbal, reading and writing skills often increase.

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Research Finding: **Many highly successful individuals have above-average but not extraordinary intelligence. Accomplishment in a particular activity is often more dependent upon hard work and self-discipline than on innate ability.**

Comment: High academic achievers are not necessarily born "smarter" than others, nor do people born with extraordinary abilities necessarily become highly accomplished individuals. Parents, teachers, coaches, and the individuals themselves can influence how much a mind or talent develops by fostering self-discipline and encouraging hard work. Most highly successful individuals have above-average but not exceptional intelligence. A high IQ seems less important than specializing in one area of endeavor, persevering, and developing the social skills required to lead and get along well with others.

Studies of accomplished musicians, athletes, and historical figures show that when they were children, they were competent, had good social and communication skills, and showed versatility as well as perseverance in practicing their skill over long periods. Most got along well with their peers and parents. They constantly nurtured their skills. And their efforts paid off.

Developing talent takes effort and concentration. These, as much as nature, are the foundation for success.

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Research Finding:

Belief in the value of hard work, the importance of personal responsibility, and the importance of education itself contributes to greater success in school.

Comment:

The ideals that children hold have important implications for their school experiences. Children who believe in the value of hard work and responsibility and who attach importance to education are likely to have higher academic achievement and fewer disciplinary problems than those who do not have these ideals. They are also less likely to drop out of school. Such children are more likely to use their out-of-school time in ways that reinforce learning. For example, high school students who believe in hard work, responsibility, and the value of education spend about 3 more hours a week on homework than do other students. This is a significant difference since the average student spends only about 5 hours a week doing homework.

Parents can improve their children's chances for success by emphasizing the importance of education, hard work, and responsibility, and by encouraging their children's friendships with peers who have similar values. The ideals that students, their parents, and their peers hold are more important than a student's socioeconomic and ethnic background in predicting academic success.

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CLASSROOM

When a superior man knows the causes which make instruction successful, and those which make it of no effect, he can become a teacher of others. Thus in his teaching, he leads and does not drag; he strengthens and does not discourage; he opens the way but does not conduct to the end without the learner's own efforts. Leading and not dragging produces harmony. Strengthening and not discouraging makes attainment easy. Opening the way and not conducting to the end makes the learner thoughtful. He who produces such harmony, easy attainment, and thoughtfulness may be pronounced a skillful teacher.

Confucius, c. 550-478 B.C.
Book XVI—*HSIO KI* (*Record on the Subject of Education*)

Research Finding:

Parental involvement helps children learn more effectively. Teachers who are successful at involving parents in their children's schoolwork are successful because they work at it.

Comment:

Most parents want to be involved with their children's schoolwork but are unsure of what to do or how to do it. Many say they would welcome more guidance and ideas from teachers. But it takes more than occasional parent-teacher conferences and school open houses to involve parents. Teachers who are successful at promoting parent participation in the early grades use strategies like these:

- Some teachers ask parents to read aloud to the child, to listen to the child read, and to sign homework papers.
- Others encourage parents to drill students on math and spelling and to help with homework lessons.
- Teachers also encourage parents to discuss school activities with their children and suggest ways parents can help teach their children at home. For example, a simple home activity might be alphabetizing books; a more complex one would be using kitchen supplies in an elementary science experiment.
- Teachers also send home suggestions for games or group activities related to the child's schoolwork that parent and child can play together.

Teachers meet parents' wishes for face-to-face contact by inviting them to the classroom to see how their children are being taught. This first-hand observation shows parents how the teacher teaches and gives parents ideas on what they can do at home.

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Reading proficiency tests for 9-, 13-, and 17-year-olds show that:

- Six percent of 9-year-olds in 1984 could not follow brief written directions or select phrases to describe pictures. Failure to perform these rudimentary reading exercises places them in danger of future school failure.

- Forty percent of 13-year-olds and 16 percent of 17-year-olds attending high school have not acquired intermediate reading skills. They are unable to search for specific information, interrelate ideas, or make generalizations about literature, science, and social studies materials. Inability to perform these tasks raises the question of how well these students can read the range of academic material they are likely to encounter in school.

- Just 5 percent of students at age 17 have advanced reading skills and strategies that enable them to synthesize and restructure ideas presented in specialized or complicated texts used by professional and technical workers.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress. (1985). *The Reading Report Card.*

Phonics

Research Finding:

Children get a better start in reading if they are taught phonics. Learning phonics helps them to understand the relationship between letters and sounds and to "break the code" that links the words they hear with the words they see in print.

Comment:

Until the 1930's and 1940's, most American children learned to read by the phonics method, which stresses the relationships between spoken sounds and printed letters. Children learned the letters of the alphabet and the sounds those letters represent. For several decades thereafter, however, the "look-say" approach to reading was dominant: children were taught to identify whole words in the belief that they would make more rapid progress if they identified whole words at a glance, as adults seem to. Recent research indicates that, on the average, children who are taught phonics get off to a better start in learning to read than children who are not taught phonics.

Identifying words quickly and accurately is one of the cornerstones of skilled reading. Phonics improves the ability of children both to identify words and to sound out new ones. Sounding out the letters in a word is like the first tentative steps of a toddler: it helps children gain a secure verbal footing and expand their vocabularies beyond the limits of basic readers.

Because phonics is a reading tool, it is best taught in the context of reading instruction, not as a separate subject to be mastered. Good phonics strategies include teaching children the sounds of letters in isolation and in words (s/i/t), and how to blend the sounds together (s-s-i-i-t).

Phonics should be taught early but not over-used. If phonics instruction extends for too many years, it can defeat the spirit and excitement of learning to read. Phonics helps children pronounce words approximately, a skill they can learn by the end of second grade. In the meantime, children can learn to put their new phonics skills to work by reading good stories and poems.

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Research Finding: **Children get more out of a reading assignment when the teacher precedes the lesson with background information and follows it with discussion.**

Comment: Young readers, and poor readers of every age, do not consistently see connections between what they read and what they already know. When they are given background information about the principal ideas or characters in a story before they read it, they are less apt to become sidetracked or confused and are more likely to understand the story fully. Afterwards, a question-and-answer discussion session clarifies, reinforces, and extends their understanding.

Good teachers begin the day's reading lesson by preparing children for the story to be read—introducing the new words and concepts they will encounter. Many teachers develop their own introductions or adapt those offered in teachers' manuals.

Such preparation is like a road map: children need it because they may meet new ideas in the story and because they need to be alerted to look for certain special details. Children who are well prepared remember a story's ideas better than those who are not.

In the discussion after the reading lesson, good teachers ask questions that probe the major elements of the story's plot, characters, theme, or moral. ("Why did Pinocchio's nose grow? Why did he lie? What did his father think about his lying? Did their feelings for each other change?") Such questions achieve two purposes: they check students' understanding of what they have just read, and they highlight the kind of meanings and ideas students should look for in future reading selections. These questions also lay the groundwork for later appreciation of the elements of literature such as theme and style. When children take part in a thought-provoking discussion of a story, they understand more clearly that the purpose of reading is to get information and insight, not just to decode the words on a page.

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Cooperative Learning

Research Finding: **Students in cooperative learning teams learn to work toward a common goal, help one another learn, gain self-esteem, take more responsibility for their own learning, and come to respect and like their classmates.**

Comment: Cooperative learning refers to assigning students to small teams—usually with four or five members. Each team approximates the overall composition of the class by mixing high and low achievers, male and female students, etc.

Several cooperative learning methods increase student achievement. For example, the teacher may present a lesson and then have students work in teams to master the material. Students are then quizzed individually and teams earn certificates or other recognition based on their team averages. Another effective method uses a group project approach, primarily in social studies. Groups plan learning activities together, divide tasks among themselves, and carry out their study plans, finally presenting a display or report to the class.

Although cooperative learning methods differ, those that consistently increase student achievement share two features. First, a group goal or reward is provided so that students must work together to succeed as a group. Second, group success depends on the individual learning of each group member, not on a single group product.

In cooperative learning, students encourage one another to do their best and help one another learn. High, average, and low achievers gain equally from cooperative learning. Low achievers contribute and experience success in academic work. Bright students deepen their understanding of concepts by explaining them to others. Discussions take place that promote critical thinking. And students learn the valuable skill of cooperating with others to achieve a common goal.

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For the young are not able to distinguish what is and what is not allegory, but whatever opinions are taken into the mind at that age are wont to prove indelible and unalterable. For which reason, maybe, we should do our utmost that the first stories that they hear should be so composed as to bring the fairest lessons of virtue to their ears.

Plato, 428-348 B.C.
The Republic, Book II

Let the Lessons for Reading be varied, that the youth may be made acquainted with good Stiles of all Kinds in Prose and Verse, and the proper Manner of reading each Kind. Sometimes a well told Story, a Piece of a Sermon, a General's Speech to his Soldiers, a Speech in a Tragedy, some Part of a Comedy, an Ode....But let such Lessons for Reading be chosen, as contain some useful Instruction, whereby the Understandings or Morals of the Youth, may at the same Time be improv'd.

Benjamin Franklin, 1706-1790
Autobiography and Other Writings

Storytelling

Research Finding: **Telling young children stories can motivate them to read. Storytelling also introduces them to cultural values and literary traditions before they can read, write, and talk about stories by themselves.**

Comment: Elementary school teachers can introduce young students to the study of literature by telling them fairy tales such as the *Three Billy Goats Gruff* or *Beauty and the Beast* and myths such as *The Iliad*. Even students with low motivation and weak academic skills are more likely to listen, read, write, and work hard in the context of storytelling.

Stories from the oral tradition celebrate heroes who struggle to overcome great obstacles that threaten to defeat them. Children are neither bored nor alienated by learning literature through storytelling; they enjoy, understand, and sympathize naturally with the goats on the bridge, Beauty in a lonely castle, and Hector and Achilles outside the walls of Troy. With the help of skillful questioning, they can also learn to reflect on the deeper meanings of these stories.

Children also benefit from reading stories aloud and from acting out dramatic narrations, whether at home or at school. Parents can begin reading to their children as infants and continue for years to come.

Storytelling can ignite the imaginations of children, giving them a taste of where books can take them. The excitement of storytelling can make reading and learning fun and can instill in children a sense of wonder about life and learning.

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Science Experiments

Research Finding: **Children learn science best when they are able to do experiments, so they can witness "science in action."**

Comment: Reading about scientific principles or having a teacher explain them is frequently not enough. Cause and effect are not always obvious, and it may take an experiment to make that clear. Experiments help children actually see how the natural world works.

Scientific explanations sometimes conflict with the way students may suppose that things happen or work. For example, most students would probably think that a basketball will fall faster than a ping-pong ball because the basketball is larger and heavier. Unless a teacher corrects this intuitive assumption by having the students perform an experiment and see the results, the students will continue to trust their intuition, even though the textbook or the teacher tells them the effect of gravity on both objects is exactly the same and that both will reach the floor at the same instant.

Many students have misconceptions even after taking a science course because they have not had opportunities to test and witness the evidence that would change their minds. To clear up misconceptions, students need to be given the chance to predict the results they anticipate in an experiment. For example, the mistaken idea that the basketball will fall faster than the ping-pong ball can be tested experimentally. The teacher can then explain why the original hypothesis was faulty. In this way experiments help students use the scientific method to distinguish facts from opinions and misconceptions.

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Estimating

Research Finding: **Although students need to learn how to find exact answers to arithmetic problems, good math students also learn the helpful skill of estimating answers. This skill can be taught.**

Comment: Many people can tell almost immediately when a total seems right or wrong. They may not realize it, but they are using a math skill called estimating.

Estimating can also be valuable to children learning math.

When students can make good estimates of the answer to an arithmetic problem, it shows they understand the problem. This skill leads them to reject unreasonable answers and to know whether they are "in the ballpark."

Research has identified three key steps used by good estimators; these can be taught to all students:

- Good estimators begin by altering numbers to more manageable forms—by rounding, for example.
- They change parts of a problem into forms they can handle more easily. In a problem with several steps, they may rearrange the steps to make estimation easier.
- They also adjust two numbers at a time when making their estimates. Rounding one number higher and one number lower is an example of this technique.

Before students can become good at estimating, they need to have quick, accurate recall of basic facts. They also need a good grasp of the place value system (ones, tens, hundreds, etc.).

Estimating is a practical skill; for example, it comes in very handy when shopping. It can also help students in many areas of mathematics and science that they will study in the future.

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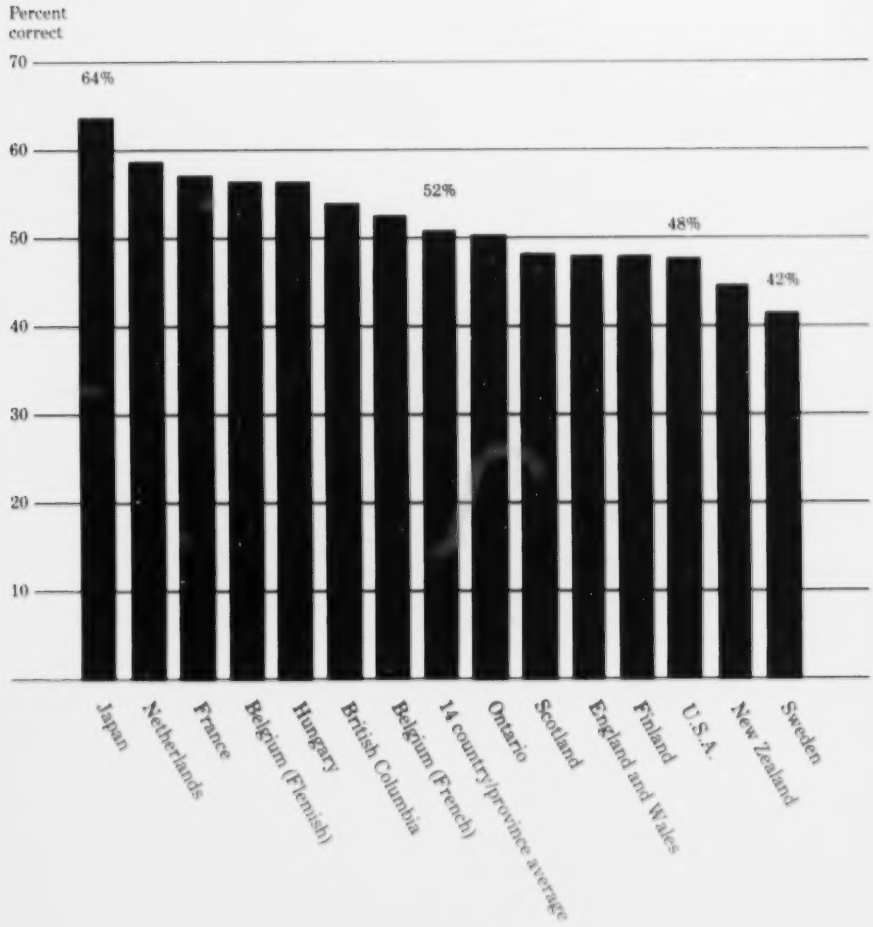
Average Mathematics Score for Students in the Eighth Grade: 1981–82



SOURCE: U.S. Department of Education, National Center for Education Statistics. (1985). *Second International Mathematics Study.*

Research Finding: **Children in early grades learn mathematics more effectively when they use physical objects in their lessons.**

Comment: Numerous studies of mathematics achievement at different grade and ability levels show that children benefit when real objects are used as aids in learning mathematics. Teachers call these objects "manipulatives."

Objects that students can look at and hold are particularly important in the early stages of learning a math concept because they help the student understand by visualizing. Students can tie later work to these concrete activities.

The type or design of the objects used is not particularly important; they can be blocks, marbles, poker chips, cardboard cutouts—almost anything. Students do as well with inexpensive or homemade materials as with costly, commercial versions.

The cognitive development of children and their ability to understand ordinarily move from the concrete to the abstract. Learning from real objects takes advantage of this fact and provides a firm foundation for the later development of skills and concepts.

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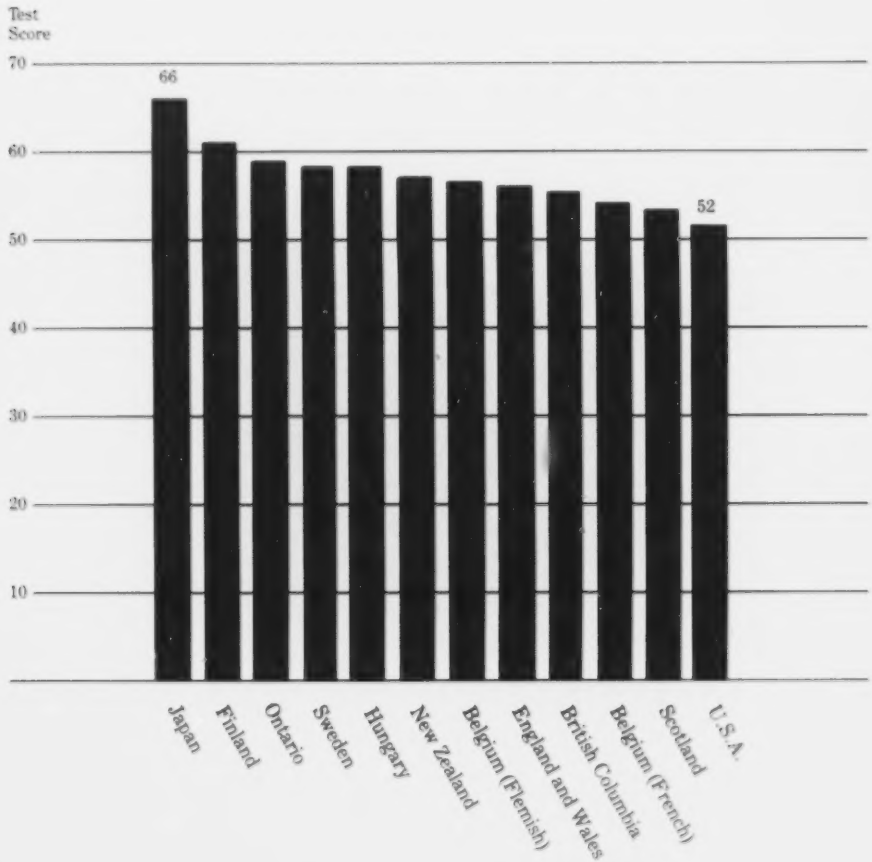
Score in Algebra and Calculus for Top 5 Percent of 12th Graders: 1981–82



SOURCE: U.S. Department of Education, National Center for Education Statistics. (1985). *Second International Mathematics Study.*

Research Finding:

Students will become more adept at solving math problems if teachers encourage them to think through a problem before they begin working on it, guide them through the thinking process, and give them regular and frequent practice in solving problems.

Comment:

Good mathematical problem solvers usually analyze the challenges they face and explore alternative strategies before starting work. Unsuccessful problem solvers often act impulsively when given a problem and follow the first idea that occurs to them. Too often, school instruction emphasizes and rewards the rapid solving of problems and fails to recognize and reinforce thoughtful behavior.

For example, consider the following elementary-level word problem: "Susan wants to buy a candy bar that costs 30 cents. The machine will take nickels, dimes and quarters in any combination. List the different combinations of coins Susan could use to pay for her candy."

A good teacher will first ask questions to ensure that the students understand the problem, such as which coins does the machine take? Can all the coins be the same? Do you think there is more than one answer for the problem? The teacher might also encourage students to formulate their own questions or retell the problem in their own words. Students can suggest strategies to solve the problem, such as making a chart or list of different combinations of coins that could be used.

After different strategies are identified, students can begin to solve the problem. If a plan does not work, the teacher can ask additional questions or provide hints to help students formulate other approaches. After the problem is solved, the teacher can have students analyze their strategies and consider alternatives.

Frequent practice in solving problems is most effective when teachers ask students questions about their thinking, give them hints when they are stumped, and help them see how some problems are related. These practices help students learn how to think problems through for themselves. They can also be taught other techniques to help them correctly solve problems, such as adding a diagram, removing extraneous information, and reorganizing data.

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To improve the Youth in Composition, they may now, besides continuing to write Letters, begin to write little Essays in Prose, and sometimes in Verse, not to make them Poets, but for this Reason, that nothing acquaints a Lad so speedily with Variety of Expression, as the Necessity of finding such Words and Phrases as will suit with the Measure, Sound, and Rhime of Verse, and at the same time well express the Sentiment.

Benjamin Franklin, 1706-1790
Autobiography and Other Writings

42

Research Finding:

The most effective way to teach writing is to teach it as a process of brainstorming, composing, revising, and editing.

Comment:

Students learn to write well through frequent practice. Good writing assignments are often an extension of class reading, discussion, and activities, not isolated exercises.

An effective writing lesson contains these elements:

- Brainstorming: Students think and talk about their topics. They collect information and ideas, frequently much more than they will finally use. They sort through their ideas to organize and clarify what they want to say.
- Composing: Students compose a first draft. This part is typically time-consuming and hard, even for very good writers.
- Revising: Students re-read what they have written, sometimes soliciting reactions from teachers, classmates, parents, and others. The most useful teacher response to an early draft focuses on what students are trying to say, not the mechanics of writing. Teachers can help most by asking for clarification, commenting on vivid expressions or fresh ideas, and suggesting ways to support the main thrust of the writing. Students can then consider the feedback and decide how to use it to improve. On the next draft, teachers may want to focus on chosen aspects of good writing such as combining sentences to improve structure and add variety. Through such exercises, teachers can help students realize that varying sentence length and structure within a paragraph yields more interesting prose. Discussing these alternatives while working on a draft emphasizes to students the importance of writing clear, interesting, and concise sentences that are appropriate for the writer's audience and goals.
- Editing: Students then need to check their final version for spelling, grammar, punctuation and other writing mechanics, and legibility.

Prompt feedback from teachers on written assignments is important. Students are most likely to write competently when schools routinely require writing in all subject areas, not just in English class.

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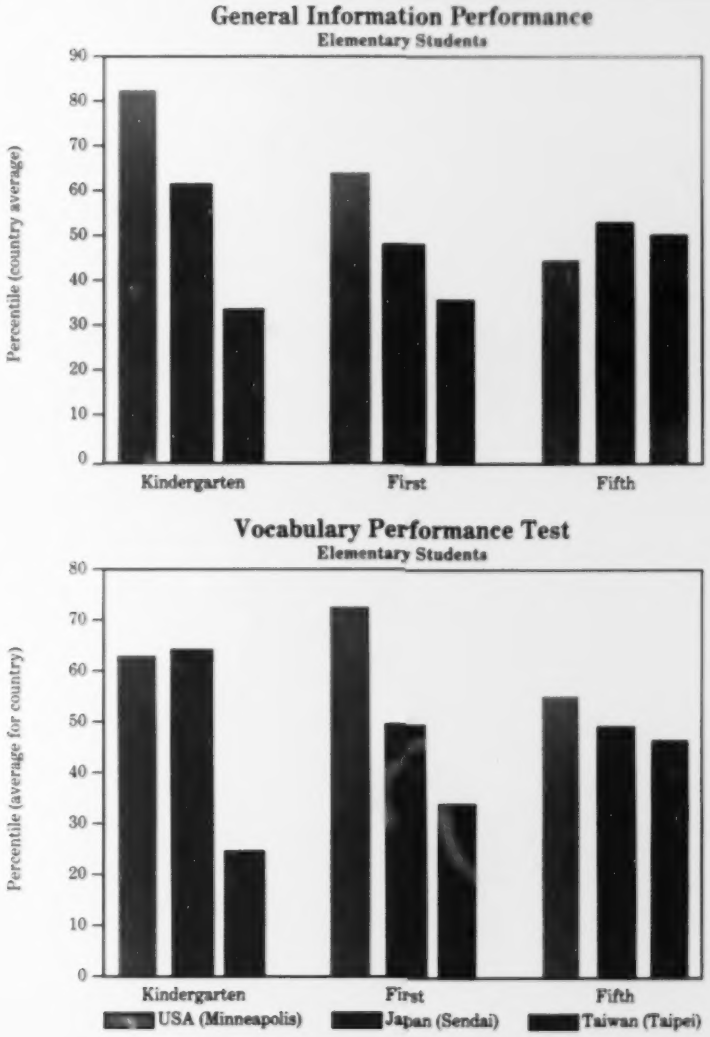

Performance tests in vocabulary and general information were administered to students in three cities of similar size in Japan, Taiwan, and the United States. The cities were: Sendai, Japan; Taipei, Taiwan, and Minneapolis, Minnesota. The subtest scores in each area were combined into a single score and the average for each country is shown in these graphs. U.S. kindergarten and first grade students performed high relative to Chinese and Japanese students; but by the fifth grade, city differences were negligible.

SOURCE: Harold Stevenson, "Culture and Schooling: Influences on Cognitive Development," in *Child Development, A Life-Span Perspective*, in press.

Research Finding: **Children learn vocabulary better when the words they study are related to familiar experiences and to knowledge they already possess.**

Comment: Most children begin school with a sizable speaking and listening comprehension vocabulary. This vocabulary grows as they connect new words to familiar concepts. Teachers can use students' personal experiences and prior knowledge to build vocabulary. Instruction in which children establish relationships among words is more effective than instruction that focuses only on word definitions. This type of vocabulary instruction is an important and specific example of the "Prior Knowledge" finding included in the classroom section of this booklet.

Teachers can foster connections between words by having students group them into categories such that relationships among the words become clear. Children can use their own experiences to create a cluster of synonyms, such as neat, tidy, clean, and spotless. They can consider similarities and differences in related words, such as examine and scrutinize. They can also group words according to certain features, such as suffixes or prefixes. Encouraging students to talk about personal experiences associated with particular words helps them grasp meanings and relationships among new words and ideas.

Using analogies is another way to help children see the relationship between old and new words. For example, when children are learning the word "province," the analogy "state is to the United States what province is to Canada" relates prior knowledge to a new concept.

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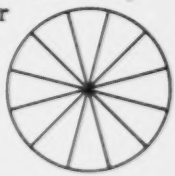
Illustrations

Research Finding: **Well-chosen diagrams, graphs, photos and illustrations can enhance students' learning.**

Comment: Illustrations that accompany text help students understand written information and remember it later. Specific kinds of pictures help students of all ages and levels of ability, especially those with learning difficulties.

Different types of illustrations serve different purposes. Some enhance students' initial understanding of written information. Others clarify the meaning of complex concepts, while still others provide images that fix designated content firmly in students' memory. For example, an illustration of an octagon clarifies the definition of the figure as a polygon with eight equal angles and eight uniform sides; a photo of a town severely damaged by an earthquake depicts the devastation far better than words alone; an illustration can help students' understand the concept that fractions are part of a whole:



> George and his twin sisters cut a pizza in 12 equal pieces and each of them then ate one-fourth of the pizza. How many pieces were left?

On the other hand, mere inclusion in the text of a portrait of an historical figure is just window-dressing. It may even be distracting, especially for students who lack basic reading skills. For these students, pictures with little textual value may inhibit the development of independent reading and comprehension skills.

It is important to distinguish among illustrations and their relationships to lessons being taught. Those that enhance the text or create supplementary images aid learning, while those not related to the text impede learning.

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Research Finding:

Teachers who set and communicate high expectations to all their students obtain greater academic performance from those students than teachers who set low expectations.

Comment:

The expectations teachers have about what students can and cannot learn may become self-fulfilling prophecies. Students tend to learn as little—or as much—as their teachers expect.

Students from whom teachers expect less are treated differently. Such students typically:

- are seated farther away from the teacher,
- receive less direct instruction,
- have fewer opportunities to learn new material, and
- are asked to do less work.

Teachers also call on these students less often and the questions they ask are more likely to be simple and basic than thought-provoking. Typically, such students are given less time to respond and less help when their answers are wrong. But when teachers give these same students the chance to answer more challenging questions, the students contribute more ideas and opinions to class discussions.

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Reading Aloud

Research Finding: **Hearing good readers read and encouraging students repeatedly to read a passage aloud helps them become good readers.**

Comment: Helping students learn to read aloud smoothly and easily is an important — but often overlooked — goal of reading instruction. Some authorities have called it the "missing ingredient" in early reading instruction. Teachers can help students become fluent readers by including supported and repeated readings as part of individualized, small group, or classroom instruction.

In supported reading, a child listens to — and reads along with — a good reader. The model can be an adult reader, another student able to read the passage fluently, or a rendition that has been tape recorded. Initially, the student follows along silently or in a soft voice. In subsequent readings of the same passage, the student becomes more fluent and the model gradually fades into the background. In repeated readings, students read a passage over and over until they can read it with ease.

Students may balk at having to read a passage more than once. Teachers can overcome this by providing instructional activities in which repeated readings are a natural component. For example, teachers can have students practice and perform dramatic readings, emphasizing the meaning and emotion of the passage. Teachers can also have students practice reading short stories and poems in unison, and practice singing popular songs together. These types of activities require repeated readings for proficient performance.

Parents can also help improve their children's reading skills by providing opportunities at home for supported and repeated readings.

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Research Finding:

Children's understanding of the relationship between being smart and hard work changes as they grow.

Comment:

When children start school, they think that ability and effort are the same thing; in other words, they believe that if they work hard they will become smart. Thus, younger children who fail believe this is because they didn't try hard enough, not because they have less ability.

Because teachers tend to reward effort in earlier grades, children frequently concentrate on working hard rather than on the quality of their work. As a result, they may not learn how to judge how well they are performing.

In later elementary grades, students slowly learn that ability and effort are not the same. They come to believe that lower ability requires harder work to keep up and that students with higher ability need not work so hard. At this stage, speed at completing tasks replaces effort as the sign of ability; high levels of effort may even carry the stigma of low ability.

Consequently, many secondary school students, despite their ability, will not expend the effort needed to achieve their potential. Underachievement can become a way of life.

Once students begin believing they have failed because they lack ability, they tend to lose hope for future success. They develop a pattern of academic hopelessness and stop trying. They see academic obstacles as insurmountable and devote less effort to learning.

Teachers who are alert to these beliefs in youngsters will keep their students motivated and on task. They will also slowly nudge their students toward the realism of judging themselves by performance. For example, teachers will set high expectations and insist that students put forth the effort required to meet the school's academic standards. They will make sure slower learners are rewarded for their progress and abler students are challenged according to their abilities.

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Research Finding: **As students acquire knowledge and skill, their thinking and reasoning take on distinct characteristics. Teachers who are alert to these changes can determine how well their students are progressing toward becoming competent thinkers and problem solvers.**

Comment: Students ordinarily go through four changes as they master skills and acquire knowledge:

- The isolated ideas and initial explanations with which students begin to learn a new topic become integrated and more widely applicable. For example, children just beginning to learn about dinosaurs tend to classify them in terms of visible characteristics, such as size and skin texture. Children who are more familiar with dinosaurs make more elaborate classifications in which sensory features become less important than more abstract features such as dietary habits.
- When confronting problems, competent learners identify fundamental principles that allow them to reach solutions smoothly, instead of wrestling with details. Where beginning physics students tend to classify problems in terms of surface features, more accomplished learners classify the same problems in terms of underlying physical principles. For example, beginning students view problems in mechanics as involving inclined planes and pulleys; more competent learners see the same problems as involving mechanical principles such as conservation of energy.
- Besides grasping rules and principles, competent learners are aware of the range of conditions under which these principles apply. In the example mentioned above, accomplished learners not only understand the principle of conservation of energy, but are also aware of problems that can be solved using such principles.
- Tasks that beginning students carry out with concentration are performed automatically by students with more expertise. This frees them to direct their attention to analysis, critical thinking, and other demanding aspects of performance. For example, when children first learn to read, they must devote much attention to the process of translating printed letters into pronounceable words. As their expertise increases, children more quickly and accurately recognize printed words. This frees them to devote more attention to grasping the meanings conveyed by the text.

By monitoring these changes, students and teachers can assess progress toward competence.

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Research Finding

How much time students are actively engaged in learning contributes strongly to their achievement. The amount of time available for learning is determined by the instructional and management skills of the teacher and the priorities set by the school administration.

Comment

Teachers must not only know the subjects they teach, they must also be effective classroom managers. Studies of elementary school teachers have found that the amount of time the teachers actually used for instruction varied between 50 and 90 percent of the total school time available to them.

Effective time managers in the classroom do not waste valuable minutes on unimportant activities; they keep their students continuously and actively engaged. Good managers perform the following time-conserving functions:

- *Planning Class Work*: choosing the content to be studied, scheduling time for presentation and study, and choosing those instructional activities (such as grouping, seatwork, or recitation) best suited to learning the material at hand;
- *Communicating Goals*: setting and conveying expectations so students know what they are to do, what it will take to get a passing grade, and what the consequences of failure will be;
- *Regulating Learning Activities*: sequencing course content so knowledge builds on itself, pacing instruction so students are prepared for the next step, monitoring success rates so all students stay productively engaged regardless of how quickly they learn, and running an orderly, academically focused classroom that keeps wasted time and misbehavior to a minimum.

When teachers carry out these functions successfully and supplement them with a well-designed and well-managed program of homework, they can achieve three important goals:

- They capture students' attention.
- They make the best use of available learning time.
- They encourage academic achievement.

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Research Finding: **Good classroom management is essential for teachers to deal with students who chronically misbehave, but such students also benefit from specific suggestions from teachers on how to cope with their conflicts and frustrations. This also helps them gain insights about their behavior.**

Comment: Problem students are those who consistently underachieve, are hostile, aggressive, defiant, hyperactive, easily distracted, socially withdrawn or rejected by other students. Many of these students don't know how to socialize with others in acceptable ways.

Teachers who successfully help problem students use several strategies. Along with enforcing simple discipline and providing alternative services when necessary, these teachers set and enforce limits in order to gain control over the problem student's behavior. Such limits are set to help these students learn to control themselves and to create an orderly atmosphere for other students, not to exact retribution.

Teachers also suggest ways the students can cope with problem situations, communicate positive expectations for improvement, and reinforce good behavior. They seek friendly personal relationships with the students, help them develop a sense of right and wrong, and encourage them to empathize with others. They also use counseling techniques to help the students understand why their behavior is troublesome.

These teachers are confident they can significantly improve the student's behavior if they invest the necessary time and effort. They make it their business to work personally with the students. They ask the parents, principal, or the school's mental health specialist (counselor, psychologist or social worker) to supplement their efforts, but not to assume total responsibility. The teacher remains engaged, too.

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Research Finding: **When teachers explain exactly what students are expected to learn, and demonstrate the steps needed to accomplish a particular academic task, students learn more.**

Comment: The procedure stated above is called "direct instruction." It is based on the assumption that knowing how to learn may not come naturally to all students, especially to beginning and low-ability learners. Direct instruction takes children through learning steps systematically, helping them see both the purpose and the result of each step. In this way, children learn not only a lesson's content but also a method for learning that content.

The basic components of direct instruction are:

- setting clear goals for students and making sure they understand those goals,
- presenting a sequence of well-organized assignments,
- giving students clear, concise explanations and illustrations of the subject matter,
- asking frequent questions to see if children understand the work, and
- giving students frequent opportunities to practice what they have learned.

Direct instruction does not mean repetition. It does mean leading students through a process and teaching them to use that process as a skill to master other academic tasks. Direct instruction has been particularly effective in teaching basic skills to young and disadvantaged children, as well as in helping older and higher ability students to master more complex materials and to develop independent study skills.

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Writing proficiency tests taken by 9-, 13-, and 17-year-olds in 1983 and 1984 show that:

- Most students are unable to write adequately except in response to the simplest of tasks.

- Students of all ages have difficulty with analytic writing. Even on the easiest task, which asked students to "compare and contrast," only 25 percent of the 11th graders, 18 percent of the 8th graders, and 2 percent of the 4th graders wrote adequate analyses.

- In persuasive writing, students had difficulty providing evidence for their points of view. They had less difficulty with tasks requiring short responses based on personal experience.

- Home environment affects writing achievement. Students whose parents have a post-high school education and those with more reading materials in their homes do better on writing tests.

- Students' positive attitudes toward writing deteriorate steadily across the grades. In grade four, 57 percent of the students report that they like to write. This falls to 39 percent by the 11th grade.

SOURCE: U.S. Department of Education, Center for Statistics, National Assessment of Educational Progress (1986). *The Writing Report Card: Writing Achievement in American Schools.*

Purposeful Writing

Research Finding: **Students become more interested in writing and the quality of their writing improves when there are significant learning goals for writing assignments and a clear sense of purpose for writing.**

Comment: Teachers often assign writing tasks to encourage specific types of learning. For example, a teacher may assign a summary if she wants students to identify all the important concepts of a particular topic. Another teacher may assign an analytic essay if he wants students to narrow their focus and examine one aspect in greater depth.

What students learn by writing depends on what they do when they write. Those who simply paraphrase when the assignment calls for analysis may learn facts, but may not be able to draw connections or make inferences about the content. Good teachers identify what they want their writing assignments to accomplish and tell students what those goals are.

Also, students feel the keenest sense of purpose when the audience for their writing extends beyond the teacher. Publishing student writing in school literary magazines and newspapers is one effective way to do this. Students can also write books for the elementary school library, guides to high school life for entering junior high school students, letters, or scripts for school-produced audio and video programs.

Teachers can encourage their students to write for audiences outside of school by having them enter writing contests, write letters to the editors of local newspapers, and correspond with students in other states and countries.

Teachers of all subjects can use writing to help students analyze and understand content. Science teachers, for example, can have students record and organize their ideas about complex concepts in learning logs. History teachers can have students study the life of a turn-of-the-century American immigrant and then interview a present-day immigrant; an article comparing the two experiences can be written for the school or local newspaper. A health teacher can have students write about the causes and effects of morphine addiction during the Civil War and relate that information to present-day drug problems. Such exercises help students and teachers see more clearly what the student understands — or doesn't yet understand.

Good teachers help students understand that the choices they make in writing affect the quality of their learning in ways that go well beyond the writing itself.

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Here are two examples of student writing rated as *adequate* levels of performance.

Persuasive Writing: Only 12 percent of 8th graders and 19.4 percent of 11th graders perform at *adequate* levels of performance in persuasive writing tasks.

I feel that I would be a very good choice for this job. I'm very responsible and I like to work with kids. I will do my best to be polite and to make the visitors want to return again. I would enjoy and appreciate this job very much. I would never be late and I would even work overtime to clean up if it's needed. I worked at a swimming pool last summer so I've had past experience in this area. I realize that there are many young people who want this job. I would appreciate it if you would consider me

SOURCE: U.S. Department of Education, Center for Statistics, National Assessment of Educational Progress (1986). *The Writing Report Card: Writing Achievement in American Schools.*

Informative Writing: Only 19 percent of 13-year-olds and 38 percent of 17-year-olds perform at *adequate* levels of performance on informative writing tasks.

In the background there is a lake or ocean with a yellowish brown cliff jutting out of the still water. By the ocean there is a large blue platform. Another platform brown in color is close to you on the left side. On it there is a orange pocket watch with black ants on it. Hanging of the edge there is a gold pocket watch with a fly on it, but the watch is melted so half of in is on the platform half is off. Right next to the gold watch there is a dead gray tree with a similer watch melting off it, but silver in color. In the midle of the picture is a melted face with a large eye (closed) with long eye lashes with a silver pocket watch melting off it.

SOURCE: U.S. Department of Education, Center for Statistics, National Assessment of Educational Progress (1986). *Writing: Trends Across the Decade, 1974-84.*

Teacher Feedback

Research Finding: **Constructive feedback from teachers, including deserved praise and specific suggestions, helps students learn, as well as develop positive self-esteem.**

Comment: Teachers should not underestimate the impact of constructive feedback on their students. Providing positive and timely comments is a practice that teachers at all levels can use. These comments help students correct errors and give them recognition when deserved. Helpful feedback praises successful aspects of a student's work and points out those areas that need improvement.

Useful feedback, whether positive or negative, is prompt, germane, and includes specific observations and recommendations. It tells students what they are doing, how they are doing it, and how they can improve. Whether written or spoken, effective feedback is initiated by the teacher and is given privately rather than in front of the class. An example of effective feedback is: "Your book report is well written, Paul. The content is clear because the ideas are presented in a logical order and the details support your main idea. Your use of some clever examples makes your book report enjoyable to read. Next time, let's work harder to organize your time so that you will meet the assigned deadline." An example of ineffective feedback is: "Your book report is well written, Paul. But it is late and I'm upset about that."

Students who are accustomed to failure and who have difficulty mastering skills react more positively to encouragement and praise from teachers than to criticism. Effective teachers successfully use praise to motivate their low-achieving students. On the other hand, higher-achieving students respond more to specific comments and suggestions about their work.

Through constructive, timely feedback, teachers can reinforce and help develop positive self-esteem in their students. Students who believe they can succeed are usually more successful than those with low self-esteem when it comes to participating in activities, working independently, getting along with others, and achieving academically.

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Tutoring

Research Finding:

Students tutoring other students can lead to improved academic achievement for both student and tutor, and to positive attitudes toward coursework.

Comment:

Tutoring programs consistently raise the achievement of both the students receiving instruction and those providing it. Peer tutoring, when used as a supplement to regular classroom teaching, helps slow and underachieving students master their lessons and succeed in school. Preparing and giving the lessons also benefits the tutors themselves because they learn more about the material they are teaching.

Of the tutoring programs that have been studied, the most effective include the following elements:

- highly structured and well-planned curricula and instructional methods,
- instruction in basic content and skills (grades 1-3), especially in arithmetic, and
- a relatively short duration of instruction (a few weeks or months).

When these features were combined in the same program, the students being tutored not only learned more than they did without tutoring, they also developed a more positive attitude about what they were studying. Their tutors also learned more than students who did not tutor.

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Memorization

Research Finding: **Memorizing can help students absorb and retain the factual information on which understanding and critical thought are based.**

Comment: Most children at some time memorize multiplication tables, the correct spelling of words, historical dates, and passages of literature such as the poetry of Robert Frost or the sonnets of Shakespeare. Memorizing simplifies the process of recalling information and allows its use to become automatic. Understanding and critical thought can then build on this base of knowledge and fact. Indeed, the more sophisticated mental operations of analysis, synthesis, and evaluation are impossible without rapid and accurate recall of bodies of specific knowledge.

Teachers can encourage students to develop memory skills by teaching highly structured and carefully sequenced lessons, with frequent reinforcement for correct answers. Young students, slow students, and students who lack background knowledge can benefit from such instruction.

In addition, teachers can teach "mnemonics," that is, devices and techniques for improving memory. For example, the mnemonic "Every Good Boy Does Fine" has reminded generations of music students that E, G, B, D, and F are the notes to which the lines on a treble staff correspond. Mnemonics helps students remember more information faster and retain it longer. Comprehension and retention are even greater when teachers and students connect the new information being memorized with previous knowledge.

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Research Finding:

Student achievement rises when teachers ask questions that require students to apply, analyze, synthesize, and evaluate information in addition to simply recalling facts.

Comment:

Even before Socrates, questioning was one of teaching's most common and most effective techniques. Some teachers ask hundreds of questions, especially when teaching science, geography, history, or literature.

But questions take different forms and place different demands on students. Some questions require only factual recall and do not provoke analysis. For example, of more than 61,000 questions found in the teacher guides, student workbooks, and tests for 9 history textbooks, more than 95 percent were devoted to factual recall. This is not to say that questions meant to elicit facts are unimportant. Students need basic information to engage in higher level thinking processes and discussions. Such questions also promote class participation and provide a high success rate in answering questions correctly.

The difference between factual and thought-provoking questions is the difference between asking: "When did Lincoln deliver the Gettysburg Address?" and asking: "Why was Lincoln's Gettysburg Address an important speech?" Each kind of question has its place, but the second one intends that the student analyze the speech in terms of the issues of the Civil War.

Although both kinds of questions are important, students achieve more when teachers ask thought-provoking questions and insist on thoughtful answers. Students' answers may also improve if teachers wait longer for a response, giving students more time to think.

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Research Finding: **The ways in which children study influence strongly how much they learn. Teachers can often help children develop better study skills.**

Comment: Research has identified several study skills used by good students that can be taught to other students. Average students can learn how to use these skills. Low-ability students may need to be taught when, as well as how, to use them.

Here are some examples of sound study practices:

- Good students adjust the way they study according to several factors:
  — the demand of the material,
  — the time available for studying,
  — what they already know about the topic,
  — the purpose and importance of the assignment, and
  — the standards they must meet.
- Good students space learning sessions on a topic over time and do not cram or study the same topic continuously.
- Good students identify the main idea in new information, connect new material to what they already know, and draw inferences about its significance.
- Good students make sure their study methods are working properly by frequently appraising their own progress.

When low-ability and inexperienced students use these skills, they can learn more information and study more efficiently.

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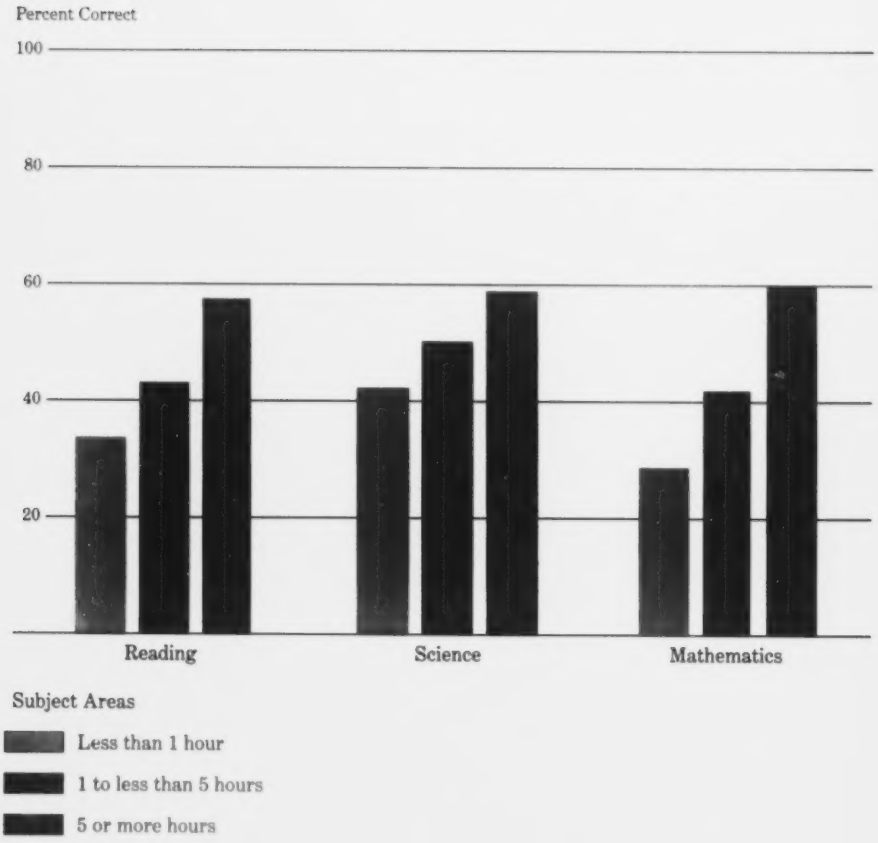
Test Scores of 1982 Seniors in Reading, Science, and Mathematics by Amount of Homework per Week



SOURCE: U.S. Department of Education, National Center for Education Statistics (1985). *Condition of Education, 1985.*

Homework: Quantity

Research Finding: **Student achievement rises significantly when teachers regularly assign homework and students conscientiously do it.**

Comment: Extra studying helps children at all levels of ability. One research study reveals that when low-ability students do just 1 to 3 hours of homework a week, their grades are usually as high as those of average-ability students who do not do homework. Similarly, when average-ability students do 3 to 5 hours of homework a week, their grades usually equal those of high-ability students who do no homework.

Homework boosts achievement because the total time spent studying influences how much is learned. Low-achieving high school students study less than high achievers and do less homework. Time is not the only ingredient of learning, but without it little can be achieved.

Teachers, parents, and students determine how much, how useful, and how good the homework is. On average, American teachers say they assign about 10 hours of homework each week—about 2 hours per school day. But high school seniors report they spend only 4 to 5 hours a week doing homework, and 10 percent say they do none at all or have none assigned. In contrast, students in Japan spend about twice as much time studying outside school as American students.

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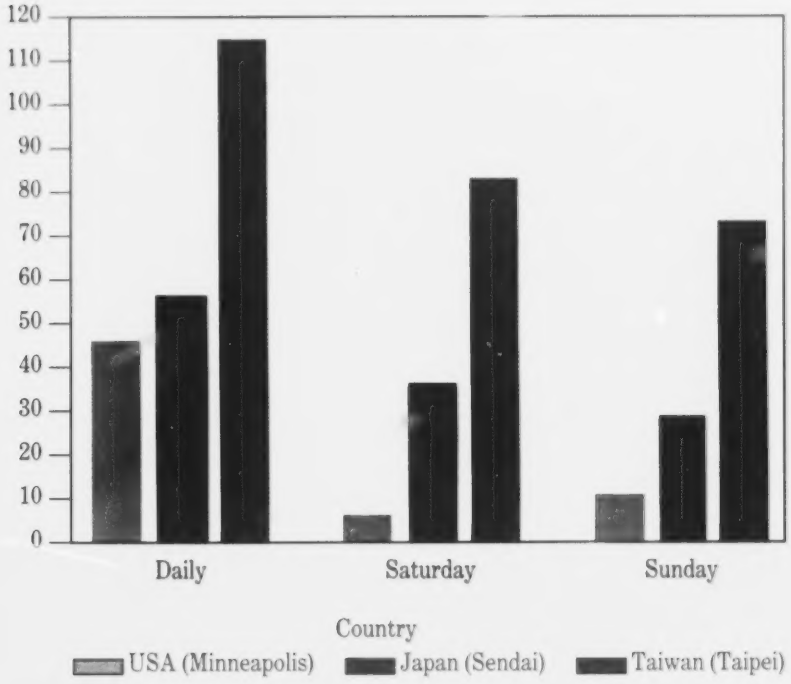
Minutes of Homework Completed



SOURCE: Stevenson, Harold W., Lee, S., and Stigler, J. W. (February 1986). "Mathematics and Achievement of Chinese, Japanese, and American Children." *Science*, Vol. 231, pp. 693-699.

Homework: Quality

Research Finding:

Well-designed homework assignments relate directly to classwork and extend students' learning beyond the classroom. Homework is most useful when teachers carefully prepare the assignment, thoroughly explain it, and give prompt comments and criticism when the work is completed.

Comment:

To make the most of what students learn from doing homework, teachers need to give the same care to preparing homework assignments as they give to classroom instruction. When teachers prepare written instructions and discuss homework assignments with students, they find their students take the homework more seriously than if the assignments are simply announced. Students are more willing to do homework when they believe it is useful, when teachers treat it as an integral part of instruction, when it is evaluated by the teacher, and when it counts as a part of the grade.

Assignments that require students to think, and are therefore more interesting, foster their desire to learn both in and out of school. Such activities include explaining what is seen or read in class; comparing, relating, and experimenting with ideas; and analyzing principles.

Effective homework assignments do not just supplement the classroom lesson; they also teach students to be independent learners. Homework gives students experience in following directions, making judgments and comparisons, raising additional questions for study, and developing responsibility and self-discipline.

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Research Finding:

Frequent and systematic monitoring of students' progress helps students, parents, teachers, administrators, and policymakers identify strengths and weaknesses in learning and instruction.

Comment:

Teachers find out what students already know and what they still need to learn by assessing student work. They use various means, including essays, quizzes and tests, homework, classroom questions, standardized tests, and parents' comments. Teachers can use student errors on tests and in class as early warning signals to point out and correct learning problems before they worsen. Student motivation and achievement improve when teachers provide prompt feedback on assignments.

Students generally take two kinds of tests: classroom tests and standardized tests. Classroom tests help teachers find out if what they are teaching is being learned; thus, these tests serve to evaluate both student and teacher. Standardized tests apply similar gauges to everyone in a specific grade level. By giving standardized tests, school districts can see how achievement progresses over time. Such tests also help schools find out how much of the curriculum is actually being learned. Standardized tests can also reveal problems in the curriculum itself. For example, a recent international mathematics test showed that U.S. students had encountered only 70 percent of what the test covered.

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Research Finding: **When teachers introduce new subject matter, they need to help students grasp its relationship to facts and concepts they have previously learned.**

Comment: The more students already know about a particular subject, the easier it is for them to acquire new information about it. Teachers can help students learn new information by organizing courses and units of study so that topics build on one another and by helping students focus on relevant background knowledge.

Teachers can also help students grasp relationships between new information and old. Not all students spontaneously relate prior knowledge to new information. For example, a student may not realize that the process involved in solving a particular equation in physics class involves the same process and logic that was used to solve an equation early in the semester.

By identifying central and recurrent patterns in content areas, teachers can help students focus on important information and not get overwhelmed by minor details. For example, teachers can help students learn a new set of scientific theories by helping them early in the learning process to organize the information into patterns and categories. They might include descriptive information about each new theory; historical information telling how the theory emerged; information about the consequences of the theory; information about other theories that explain similar phenomena; and evidence for or against the theory. This process of organizing information helps students to recognize new examples of previously learned concepts and ideas.

As teachers present new information in the classroom, they should ask: "What background knowledge are my students likely to possess that will help them grasp this information?" For example, a child's knowledge of how hot water flows through a pipe can be a helpful analogy in learning and understanding how electricity flows through wires.

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SCHOOL

Instruction increases inborn worth, and right discipline strengthens the heart.

Horace, 65-8 B.C.
Odes, Book IV

Effective Schools

Research Finding:

The most important characteristics of effective schools are strong instructional leadership, a safe and orderly climate, school-wide emphasis on basic skills, high teacher expectations for student achievement, and continuous assessment of pupil progress.

Comment:

One of the most important achievements of education research in the last 20 years has been identifying the factors that characterize effective schools, in particular the schools that have been especially successful in teaching basic skills to children from low-income families. Analysts first uncovered these characteristics when comparing the achievement levels of students from different urban schools. They labeled the schools with the highest achievement as "effective schools."

Schools with high student achievement and morale show certain characteristics:

- vigorous instructional leadership,
- a principal who makes clear, consistent, and fair decisions,
- an emphasis on discipline and a safe and orderly environment,
- instructional practices that focus on basic skills and academic achievement,
- collegiality among teachers in support of student achievement,
- teachers with high expectations that all their students can and will learn, and
- frequent review of student progress.

Effective schools are places where principals, teachers, students, and parents agree on the goals, methods, and content of schooling. They are united in recognizing the importance of a coherent curriculum, public recognition for students who succeed, promoting a sense of school pride, and protecting school time for learning.

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Research Finding: **Schools that encourage academic achievement focus on the importance of scholastic success and on maintaining order and discipline.**

Comment: Good schools focus sharply on learning. In effective schools, the school climate—some call it the "learning environment"—puts academics first. Principals and teachers believe they can make a difference in what students learn. Teachers and students believe each student is capable of making significant academic progress. Students understand and agree that their first priority is to learn.

School activities reinforce these attitudes. Routines discourage disorder and disruptions. Teachers and principals protect the classroom from interruptions. Academic success is expected and rewarded. Public ceremonies honor student achievement.

Incoming students know the school's reputation and experienced students affirm the value placed on learning. Teacher morale is high and turnover is low. When there are openings, principals recruit and select teachers who share the school's goals and standards.

Principals work with teachers, students, parents, and community members to develop the school's learning environment. Once established, that learning environment becomes a durable part of the school's tradition.

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Research Finding:

Good character is encouraged by surrounding students with good adult examples and by building upon natural occasions for learning and practicing good character. Skillful educators know how to organize their schools, classrooms, and lessons to foster such examples.

Comment:

The home, the school, and the community all contribute to a child's character development. Children learn character traits such as honesty, courtesy, diligence, and respect for others in part from examples set by their parents, teachers, peers and the community as a whole.

Schools can reinforce good character by how they organize and present themselves, how the adults conduct themselves, and how standards for behavior and integrity are set and enforced. Positive character traits are reinforced through school activities that identify worthwhile achievements and exemplary behavior of students.

Educators become good role models through their professionalism, courtesy, cooperation, and by demanding top performance from their students. They maintain fair and consistent discipline policies, including matters of attendance, punctuality, and meeting assignment deadlines.

Teachers can use examples from life and literature to nurture qualities of good character and ethical behavior. History and biographies can provide role models, such as Martin Luther King and Helen Keller, to identify admirable character traits and to broaden students' horizons. Stories, fables, and poetry can reinforce enduring standards of conduct and create powerful images that enhance moral awareness and self-recognition. For example, *The Little Engine That Could* teaches young children perserverance; Scrooge illustrates the ability to change from bad to good; *Captains Courageous* portrays a spoiled boy's transformation into a loyal friend; and *The Adventures of Huckleberry Finn* details a young boy's struggle with his conscience as he decides to reject the accepted norms of behavior to defend his friend Jim.

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Research Finding:

The use of libraries enhances reading skills and encourages independent learning.

Comment:

Research has shown that participating in library programs reinforces children's skills and interest in reading. Summer reading programs offered by public libraries, for example, reinforce reading skills learned during the school year. Library programs for pre-school children encourage children's interest in learning to read. Both types of programs provide many opportunities for reading, listening and viewing materials.

Public and school libraries can enhance reading instruction by offering literature-based activities that stress the enjoyment of reading as well as reading skills. Hearing stories and participating in such activities help young children want to learn to read. These programs help children become more aware of the literary and cultural heritage that is necessary to help them understand much of what they will read and hear as they grow up.

Use of both public and school libraries encourages students to go beyond their textbooks to locate, explore, evaluate and use ideas and information that enhance classroom instruction. Competent library personnel can help students learn how to seek information and give them opportunities to practice finding information.

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Research Finding: **Schools contribute to their students' academic achievement by establishing, communicating, and enforcing fair and consistent discipline policies.**

Comment: For 16 of the last 17 years, the public has identified discipline as the most serious problem facing its schools. Effective discipline policies contribute to the academic atmosphere by emphasizing the importance of regular attendance, promptness, respect for teachers and academic work, and good conduct.

Behavior and academic success go together. In one recent survey, for example, high school sophomores who got "mostly A's" had one-third as many absences or incidents of tardiness per semester as those who got "mostly D's." The same students were 25 times more likely to have their homework done and 7 times less likely to have been in trouble with the law. Good behavior as a sophomore led to better grades and higher achievement as a senior.

The discipline policies of most successful schools share these traits:

- Discipline policies are aimed at actual problems, not rumors.
- All members of the school community are involved in creating a policy that reflects community values and is adapted to the needs of the school.
- Misbehavior is defined. Because not everyone agrees on what behavior is undesirable, defining problems is the first step in solving them. Students must know what kinds of behavior are acceptable and what kinds are not.
- Discipline policies are consistently enforced. Students must know the consequences of misbehavior, and they must believe they will be treated fairly.
- A readable and well-designed handbook is often used to inform parents and students about the school's discipline policy.

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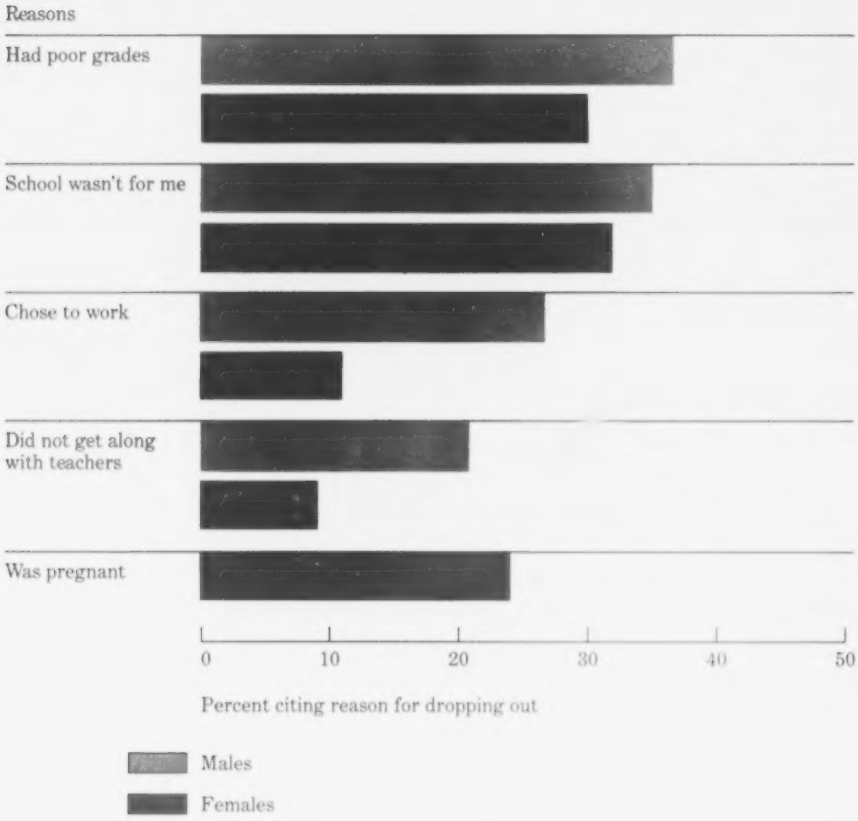
Reasons for Dropping Out of High School, 1982[1]



[1]Some students gave multiple reasons for dropping out.

SOURCE: U.S. Department of Education, National Center for Education Statistics. (1983). "High School Dropouts: Descriptive Information from High School and Beyond."

Research Finding:

A school staff that provides encouragement and personalized attention, and monitors daily attendance can reduce unexcused absences and class-cutting.

Comment:

Absences are a major problem at all levels of school. Too many missed opportunities to learn can result in failure, dropping out, or both.

The school climate set by teachers, counselors, and administrators can significantly affect student attendance. Teachers who establish and communicate clear goals and high standards for performance and behavior, maintain discipline, allow as much learning time as possible, and consistently show support for their students have fewer attendance problems.

Good principals set the tone of schools by fostering a school climate that is conducive to teaching and learning. They address truancy problems by establishing preventive policies to monitor and control attendance. These policies are clearly communicated to students and are fairly and consistently enforced.

A school with an effective system for monitoring both daily and class attendance can identify potential dropouts early and then provide appropriate service to them.

An effective monitoring system also lets parents know when their children aren't in school. Research indicates that parents want to hear promptly if their children have unexcused absences. Some schools use staff members to check attendance records and phone the parents of absent students. Others have begun using automatic calling devices that leave a recorded message with parents. Schools using such devices report substantial increases in attendance.

Good attendance in school is another example of the connection of time and learning. Just as homework amplifies learning, regular attendance exposes students to a greater amount of academic content and instruction. Students, of course, must concentrate on their lessons in order to benefit from attendance.

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Research Finding: **Successful principals establish policies that create an orderly environment and support effective instruction.**

Comment: Effective principals have a vision of what a good school is and systematically strive to bring that vision to life in their schools. School improvement is their constant theme. They scrutinize existing practices to assure that all activities and procedures contribute to the quality of the time available for learning. They make sure teachers participate actively in this process. Effective principals, for example, make opportunities available for faculty to improve their own teaching and classroom management skills.

Good school leaders protect the school day for teaching and learning. They do this by keeping teachers' administrative chores and classroom interruptions to a minimum.

Effective principals visibly and actively support learning. Their practices create an orderly environment. Good principals make sure teachers have the necessary materials and the kind of assistance they need to teach well.

Effective principals also build morale in their teachers. They help teachers create a climate of achievement by encouraging new ideas; they also encourage teachers to help formulate school teaching policies and select textbooks. They try to develop community support for the school, its faculty, and its goals.

In summary, effective principals are experts at making sure time is available to learn, and at ensuring that teachers and students make the best use of that time.

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Succeeding In A New School

Research Finding: **When schools provide comprehensive orientation programs for students transferring from one school to another, they ease the special stresses and adjustment difficulties those students face. The result is apt to be improved student performance.**

Comment: Each year approximately 30 percent of American public school enrollments consists of first-time students and transfer students. It takes most new students several months to adjust to a new school. In addition, teenagers face the normal stresses of adolescence. If a smooth transition to a new school does not take place, difficulties may develop that can affect a child throughout his school career.

An effective orientation program provides students and parents with basic information about the school, such as rules, policies and procedures, where to go and whom to see for what, etc. It encourages students to participate in extracurricular activities and provides them with good role models for appropriate school behavior.

A good program also stresses self-control and individual responsibility for actions and teaches students how to express dissatisfaction in socially acceptable ways and how to promote change.

An effective orientation program is a process rather than a single event; it addresses social and personal concerns as well as academic ones. Often, a deliberate attempt is made to integrate new students into the school by providing opportunities for them to relate to others and develop new friendships. Such programs give new students a sense of belonging and acceptance by other students.

A well-planned orientation program by the school can reduce the negative effects of transition and make adjusting to the new school an enriching experience rather than a traumatic one. Such a program can prevent potential problems related to academic achievement, attendance, and personal conduct.

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Research Finding: **Underachieving or mildly handicapped students can benefit most from remedial education when the lessons in those classes are closely coordinated with those in their regular classes.**

Comment: Children with academic problems, especially in reading, are often referred to compensatory, remedial, or special education classes. These classes are supposed to offer them extra help in the subject with which they have difficulty. Remedial instruction is most successful when it is built upon and coordinated with a solid core curriculum. Therefore, the most beneficial remedial instruction for underachievers or mildly handicapped students is carefully and closely coordinated with regular classroom instruction. When such programs are not synchronized with what is going on in the regular classroom, the result is apt to be fragmented, even incoherent lessons for underachieving students.

Careful advance planning and close coordination of instruction help teachers give underachieving students more integrated and consistent lessons and, more importantly, provide additional instruction. For example, a remedial reading teacher could link a reading lesson to regular classroom activities by:

- focusing on the same skill, such as comprehension, that the regular classroom teacher is stressing,
- working on vocabulary by using words and concepts used in the child's science class that week,
- stressing the same reading strategies emphasized that day during the regular classroom reading group, and
- giving the child additional explanations and practice on concepts introduced in the regular classroom.

Organizing school staff into "teams" with common planning times and regular scheduled meetings helps regular classroom teachers and remedial teachers coordinate lessons and formulate a common sense of purpose and direction. In addition, such "team" planning and coordination helps teachers address the instructional and curricular needs of individual children.

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Collegiality

Research Finding: **Students benefit academically when their teachers share ideas, cooperate in activities, and assist one another's intellectual growth.**

Comment: Although high student achievement is most likely in a school with high faculty morale and a sense of shared responsibility, most teachers are independent and believe that the responsibility of running their classrooms is theirs alone. In some studies, as many as 45 percent of the teachers report *no* contact with each other during the workday; another 32 percent say they have infrequent contact.

As a result, these teachers fail to share experience and ideas or to get support from their colleagues. Isolation may undermine effective instruction.

Good instruction flourishes when teachers collaborate in developing goals that emphasize student achievement. Effective schools have a climate of staff collegiality and use mutual support as a means of improving pupil achievement. School leaders in such schools set aside time for faculty interaction and provide specific opportunities for teachers and administrators to work together on such tasks as setting school policies, improving instructional practice, selecting textbooks, and strengthening discipline.

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Research Finding: **Teachers welcome professional suggestions about improving their work, but they rarely receive them.**

Comment: When supervisors comment constructively on teachers' specific skills, they help teachers become more effective and improve teachers' morale. Yet, typically, a supervisor visits a teacher's classroom only once a year and makes only general comments about the teacher's performance. This relative lack of specific supervision contributes to low morale, teacher absenteeism, and high faculty turnover.

Supervision that strengthens instruction and improves teachers' morale has these elements:

- agreement between supervisor and teacher on the specific skills and practices that characterize effective teaching,
- frequent observation by the supervisor to see if the teacher is using these skills and practices,
- a meeting between supervisor and teacher to discuss the supervisor's impressions,
- agreement by the supervisor and teacher on areas for improvement, and
- a specific plan for improvement, jointly constructed by teacher and supervisor.

Principals who are good supervisors make themselves available to help teachers. They make teachers feel they can come for help without being branded failures.

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Research Finding:

Many children who are physically handicapped or have emotional or learning problems can be given an appropriate education in well-supported regular classes and schools.

Comment:

In the past, educators often assumed that some children needed "special" education that could be provided only in special places—such as resource rooms, special classes, or special schools. In some cases, handicapped children were removed from their own homes and local schools and placed in special residential schools. Now more of them are learning well in regular classes and schools.

Several instructional practices have proven effective in serving students with special needs in regular classrooms and schools. When teachers have children work on assignments and projects together, handicapped and nonhandicapped students benefit from each other's insight and expertise. Teachers encourage independence by creating "active" learning opportunities where students initiate projects from course work and then complete them individually or with other students. Computer-assisted instruction is especially useful for students who need extra instructional support. And lessons and units of study which are structured but individually paced offer advantages to all students and make the regular classroom effective for children with handicaps—especially when special education and school psychologists work together with regular teachers.

Regular teachers can support each other by meeting to discuss children's problems, provide instructional suggestions and support, and increase teacher skills and comfort in dealing with children with special needs. Such meetings provide a forum where teachers can use their creativity and problem-solving abilities, share their skills and knowledge, and help each other cope with classroom problems.

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This I regard as history's highest function, to let no worthy action be uncommemorated, and to hold out the reprobation of posterity as a terror to evil words and deeds.

Tacitus, 55-118
Annals

For this purpose the reading in the first stage, where they will receive their whole education, is proposed, as has been said, to be chiefly historical. History, by apprising them of the past, will enable them to judge of the future; it will avail them of the experience of other times and other nations; it will qualify them as judges of the actions and designs of men; it will enable them to know ambition under every disguise it may assume; and knowing it, to defeat its views.

Thomas Jefferson, 1743-1826
Notes on Virginia and Other Writings

Research Finding:

Students read more fluently and with greater understanding if they have knowledge of the world and their culture, past and present. Such knowledge and understanding is called cultural literacy.

Comment:

In addition to their knowledge of the physical world, students' knowledge of their culture determines how they will grasp the meaning of what they read. Students read and understand passages better when the passages refer to events, people and places—real or fictional—with which the students are familiar.

Students' understanding of the subtleties and complexities of written information depends on how well they understand cultural traditions, attitudes, values, conventions, and connotations. The more literate students are in these ways, the better prepared they will be to read and understand serious books, magazines, and other challenging material.

Most school teachers, college professors, journalists, and social commentators agree that the general knowledge of American students is too low, and getting lower. Surveys document great gaps in students' basic knowledge of geography, history, literature, politics, and democratic principles. Teaching is hindered if teachers cannot count on their students sharing a body of knowledge, references, and symbols.

Every society maintains formal and informal mechanisms to transmit understanding of its history, literature, and political institutions from one generation to the next. A shared knowledge of these elements of our past helps foster social cohesion and a sense of national community and pride.

In the United States, the national community comprises diverse groups and traditions; together they have created a rich cultural heritage. Cultural literacy not only enables students to read better and gain new knowledge; it enables them to understand the shared heritage, institutions, and values that draw Americans together.

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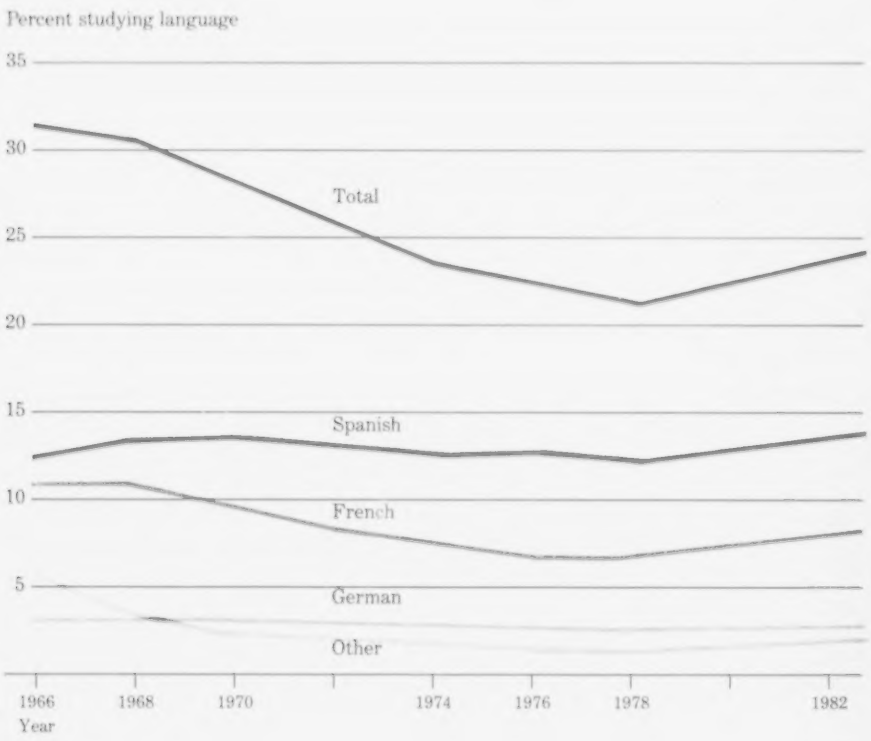
Percent of High School Students Studying Foreign Language



SOURCE: U.S. Department of Education, Center for Statistics (1986). *Digest of Education Statistics, 1985-86;* and American Council on the Teaching of Foreign Languages, Inc. (1985 unpublished).

Research Finding:

The best way to learn a foreign language in school is to start early and to study it intensively over many years.

Comment:

The percentage of high school students studying foreign language declined from 73 percent in 1915 to 15 percent in 1979. Some States and schools are beginning to emphasize foreign language study. However, even with this new emphasis, most students who take a foreign language study it for 2 years or less in high school and do not learn to communicate with it effectively.

Students are most likely to become fluent in a foreign language if they begin studying it in elementary school and continue studying it for 6 to 8 years. Although older students may learn foreign languages faster than younger ones, students who start early are likely to become more proficient and to speak with a near-native accent.

"Total immersion" language study programs in the United States and Canada that begin instruction in the early grades and teach all subjects in the foreign language have been highly successful in teaching all students both the language and regular academic subjects.

If new foreign language requirements are really to improve students' language competence, experience has shown that schools will need to:

- find qualified teachers,
- set consistent goals,
- select appropriate materials, and
- continue a coherent program of instruction from elementary to junior to senior high school.

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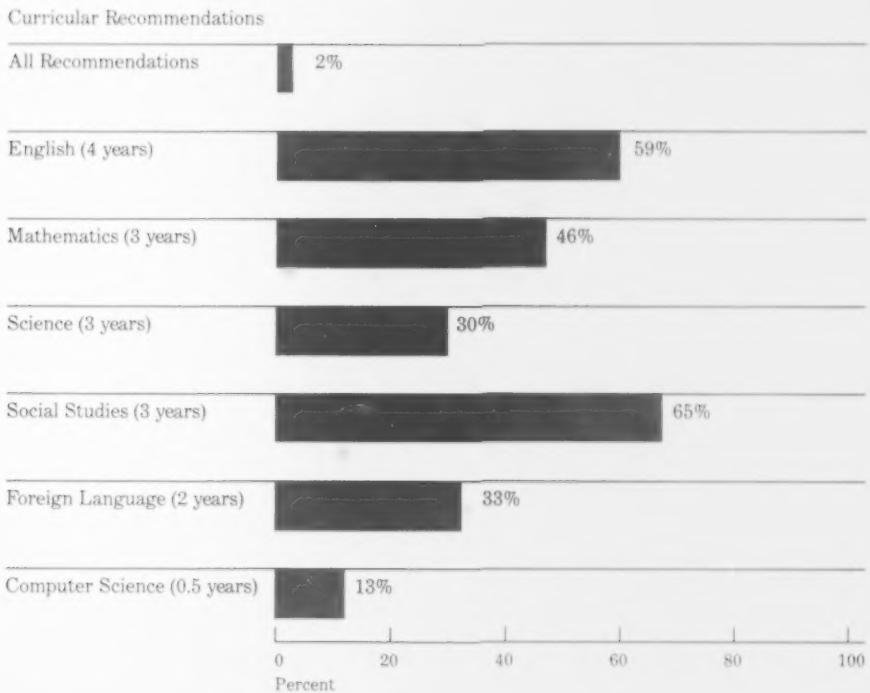
Percent of 1982 High School Graduates Who Met Curricular Recommendations of the National Commission on Excellence in Education



SOURCE: U.S. Department of Education, National Center for Education Statistics (1984). *Condition of Education, 1984.*

Rigorous Courses

Research Finding:

The stronger the emphasis on academic courses, the more advanced the subject matter, and the more rigorous the textbooks, the more high school students learn. Subjects that are learned mainly in school rather than at home, such as science and math, are most influenced by the number and kind of courses taken.

Comment:

Students often handicap their intellectual growth by avoiding difficult courses. In order to help young people make wise course choices, schools are increasingly requiring students to take courses that match their grade level and abilities; schools are also seeing to it that the materials used in those courses are intellectually challenging.

The more rigorous the course of study, the more a student achieves, within the limits of his capacity. Student achievement also depends on how much the school emphasizes a subject and the amount of time spent on it: the more time expended, the higher the achievement. Successful teachers encourage their students' best efforts.

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Research Finding:

Handicapped high school students who seek them are more likely to find jobs after graduation when schools prepare them for careers and private sector businesses provide on-the-job training.

Comment:

Many individuals with disabilities, especially those handicapped youth who do not attend college, are chronically unemployed. Programs and services to help them get jobs are fragmented. There is little coordination between employment agencies and schools or programs that offer compensatory, social or vocational help.

Successful school-to-work transition programs have been developed that improve coordination between school staffs, state agencies and community employers. Under these programs, special education teachers help students explore career possibilities and develop job-seeking skills and work ethics. Vocational educators cooperate with special education teachers to adapt their instruction to the needs of the students.

Such programs find jobs for students by offering prospective employers incentives such as pre-screened employees, on-the-job assistance with trainees, and most importantly, wage stipends. Employment and rehabilitation staff provide expertise on a referral basis. Additional resources are needed to cover the schools' excess cost of developing jobs and offering training stipends.

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Research Finding:

Skimpy requirements and declining enrollments in history classes are contributing to a decline in students' knowledge of the past.

Comment:

Earlier generations of American students commonly learned the history of American institutions, politics, and systems of government, as well as some of the history of Greece, Rome, Europe, and the rest of the world. Today, most States require the study of only American history and other course work in social studies. Indications are that students now know and understand less about history.

In most State requirements for high school graduation, a choice is offered between history on the one hand and courses in social science and contemporary social issues on the other. Most high school students, even those in the academic track, take only one history course. Students enroll in honors courses in history at less than half the rate they enroll for honors courses in English and science. Typically, requirements have also declined for writing essays, producing research-based papers, and reading original sources. Similar declines are reported in the requirements for such reasoning skills as evaluating sources of information, drawing conclusions, and constructing logical arguments.

As a result, students know too little about the past. The National Assessment of Education Progress has pilot-tested the knowledge of 17-year-olds about American history. The preliminary results of this study, due for release in 1987, indicate that two-thirds of the students tested could not place the Civil War within the period 1850-1900; half could not identify Winston Churchill or Stalin.

The decline in the study of history may hinder students from gaining an historical perspective on contemporary life.

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Acceleration

Research Finding

Advancing gifted students at a faster pace results in their achieving more than similarly gifted students who are taught at a normal rate.

Comment

Advocates of accelerating the education of gifted and talented students believe that this practice furnishes the extra challenge these students need to realize their full potential. Critics believe acceleration may result in emotional and social stress if a child is unable to get along with older students. Some, concerned about those who remain behind, characterize acceleration as unfair or undemocratic.

Research evidence generally supports acceleration. When abler students are moved ahead in school, they typically learn more in less time than students of the same age and ability who are taught at the conventional rate. Accelerated students score a full grade level or more higher on achievement tests than their conventionally placed schoolmates. Some may score several years ahead of their schoolmates.

Acceleration does not damage students' attitudes about school subjects. Nor do accelerated students necessarily become drudges or bookworms; they ordinarily continue to participate in extracurricular activities. Such students often become more sure about their occupational goals.

Accelerated students perform as well as talented but older students in the same grade. Despite being younger, accelerated students are able to capitalize on their abilities and achieve beyond the level available to them had they remained in the lower grade.

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Research Finding:

High school students who complement their academic studies with extracurricular activities gain experience that contributes to their success in college.

Comment:

High school class rank and test scores are the best predictors of academic success in college, but involvement sustained over time in one or two extracurricular activities contributes to overall achievement in college. On the other hand, when these activities become ends in themselves, academic performance may suffer.

Students who participate in extracurricular activities gain some significant advantages. Among them are:

- opportunities for recognition, personal success, and broader experience to complement their academic achievement,
- the chance to develop intellectual, social, cultural, and physical talents to round out their academic education, and
- the opportunity to extend the boundaries of the classroom by acquiring direct experience with the content and worth of a subject; for example, when drama club members study and present the plays of Shakespeare, or when debaters gain practice in applied logic, research, and public presentations.

Although such activities as athletics are less clearly related to academic goals, they do provide opportunities for physical growth and self-discipline. Indeed, all these activities can extend the range of experience that schools can offer.

But when extracurricular activities get out of balance, problems can arise, as when high school athletes treat sports as an alternative to learning rather than an addition to it. Distracted by the prestige they earn in sports, student athletes may fail to prepare adequately for the academic requirements of college or the workplace. This situation has worsened in recent years, and many abuses have come to light, such as lowering (or winking at) the academic requirements for sports eligibility. There have been recent attempts to rectify this situation by reinstating academic criteria as a condition for participation in all extracurricular activities.

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Research Finding:

When students work more than 15 to 20 hours per week, their grades may suffer. They can benefit, however, from limited out-of-school work.

Comment:

The proportion of teenagers holding part-time jobs has increased dramatically recently. Some students work because they need the money; others because they want to have adult-style responsibilities and experiences. But holding a part-time job for more than 15 to 20 hours per week during the school year may actually do more harm than good. Working longer than that often accompanies a decline in school performance and diminished interest in school.

Students can benefit from jobs, however, if work hours are limited, the experience is well-selected, and the job does not interfere with their school work. Such jobs help improve knowledge about the workplace, foster positive attitudes and habits, and open up possibilities for careers. Although many students find jobs on their own, some join school-sponsored job programs. Such programs, when well-conceived:

- Manage the number of hours students work, thus controlling the one aspect of work experience most likely to harm students' grades.
- Carefully monitor and guide the work experience, coordinating the efforts of students and employers so that both benefit. Good programs give students opportunities to relate their work experience to other school activities.
- Make sure the job meets the student's needs. Some jobs, for example, may give students an opportunity to experiment with different career possibilities; others may give students chances to acquire and practice technical skills.

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Research Finding

Business leaders report that students with solid basic skills and positive work attitudes are more likely to find and keep jobs than students with vocational skills alone.

Comment

As new technologies make old job skills obsolete, the best vocational education will be solid preparation in reading, writing, mathematics, and reasoning. In the future, American workers will acquire many of their job skills in the workplace, not in school. They will need to be able to master new technologies and upgrade their skills to meet specialized job demands. Men and women who have weak basic skills, or who cannot readily master new skills to keep pace with change, may be only marginally employed over their lifetimes.

Business leaders recommend that schools raise academic standards. They point to the need for remedial programs to help low-achieving students and to reduce dropping out.

Business leaders stress that the school curriculum should emphasize literacy, mathematics, and problem-solving skills. They believe schools should emphasize such personal qualities as self-discipline, reliability, perseverance, teamwork, accepting responsibility, and respect for the rights of others. These characteristics will serve all secondary students well, whether they go on to college or directly into the world of work.

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Now to put into effect all the suggestions which I have given is the province of prayer, perhaps, or exhortation. And even to follow zealously the majority of them demands good fortune and much careful attention, but to accomplish this lies within the capability of man.

Plutarch, 46-120
The Education of Children
(Volume 1 of Plutarch's *Moralia*)

S4

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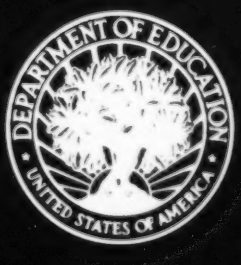
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